High Altitudes for Consumptives

TUSSEY

PRINCIPLES OR GUIDES

FOR A

BETTER SELECTION OR CLASSIFICATION

OF

CONSUMPTIVES

AMENABLE TO HIGH ALTITUDE TREATMENT

AND

TO THE SELECTION OF PATIENTS WHO MAY BE MORE SUCCESSFULLY TREATED IN THE ENVIRONMENT TO WHICH THEY WERE ACCUSTOMED PREVIOUS TO THEIR ILLNESS

BY

A. EDGAR TUSSEY, M.D.

ADJUNCT PROFESSOR OF DISEASES OF THE CHEST IN THE PHILADELPHIA POLYCLINIC AND SCHOOL FOR GRADUATES IN MEDICINE, AND CONSULTING PHYSICIAN TO THE CENTRAL BRANCH OF THE Y. M. C. A. GYMNASIUM, FIFTEENTH AND CHESTNUT STREETS, PHILADELPHIA

PHILADELPHIA

P. BLAKISTON, SON & CO.

1012 WALNUT STREET

1896

PRESS OF WM. F. FELL & CO.,
1220-24 SANSOM ST.,
PHILADELPHIA.

PREFACE.

We owe the members of the medical profession no apology for offering to them this little work. The scope of the work undertaken has grown, on the one hand, out of a thorough knowledge of the needs of the general medical profession, on the other hand out of a wide experience in the matter of carefully and scientifically noting and weighing those vital factors, which underlie and condition all even approximately correct estimates of the patient's resources. We feel that the principles herein contained, if carefully and correctly applied, will, in many, many instances yield to the honest, conscientious inquirer for truth a rich harvest of results.

It will be noted that while the guides contained herein are applicable to a proper selection of cases that may be most successfully treated at home, they are in virtue of the fact of their being bases equally applicable to any and all climates within the temperate zone. Governing the selection of any case for whose treatment a climate of a less degree of density is contemplated, we may truthfully assert that if the principles laid down are applied with due faithfulness, any altitude more *elevated* than the one

in which the patient has been a *resident*, may be in a large proportion of cases used as a therapeutic agent with the most pleasing results possible or resident in any plan of treatment. With these remarks, by way of introduction, we commit it to your careful and unbiased consideration with a deep heart desire to minister in any and every way possible to the comfort and well-being of a class of patients whose always sad condition has ever appealed to my deepest sympathy, and created a burning desire to give my best energies to the work of reducing, as far as possible, the untold number of victims which consumption has laid upon its altar of sacrifice.

A. E. Tussey.

1208 Spruce Street, Philadelphia.

CONTENTS.

HIGH ALTITUDE TREATMENT

OF

CONSUMPTION.

The sad lack of uniformity of desirable results, consequent upon the decision of medical men that this patient or that patient should be sent far from home (usually at an enormous sacrifice) to breathe an atmosphere upon which the effect of an elevated region is exerted is indeed painful to contemplate.

The writer does not wish to be understood to believe that his *judgment* in the matter of selecting cases which would be much improved or cured, it may be, by climatic treatment is superior to the discrimination usually exhibited by medical men and women.

He does feel, however, that a large clinical experience in chest-work, coupled with a most careful and scientific investigation of those conditions, local and general, through which the agency mentioned either blesses or curses, entitles him to speak with more authority than many who have been negligent in the matter of using a measure of discernment which would have protected them from criticism,

and, what is far more important, those confiding in their *supposed skill* from the dire consequences to which the miserable judgment of the medical man exposed them.

I would not be justified in saying that all mistakes in this direction could be avoided.

I shall not assert, either, that a proper use of all the light we have to-day would invariably guard the public from evil consequences, but I may very truthfully say that it would be a *protection* to the lives of very many indeed did they show a wiser discretion by selecting for medical counselors those who could offer a satisfactory reply to the burning question: "Upon what physical basis or upon what therapeutic, climatic indication have you sent away from home and dear ones those trusting to you for judicious advice?"

To censure anyone for an unavoidable error is to commit an act of unkindness which is closely akin to cruelty.

No amount of *censure*, on the other hand, can be too severe for the medical adviser who carelessly fails to avail himself of that knowledge which alone constitutes a correct basis for a logical conclusion, which would work good and only good to the patient, instead of the evil of a lonely death in a distant land.

I care not a straw how well developed or cultivated a man's powers of ratiocination may be, the premises of his medical syllogisms must embody important knowledge if he would have his conclusions characterized by wisdom and be of value to the patient.

The therapeutic value of certain climates, in fact, of all climates much used as resorts for consumptives, is as well

known, better, perhaps, than strychnia, quinin, hydriodic acid, and the hypophosphites are known. In fact, I believe that the therapeutics of climates may be used with more uniformly better results than many of the drugs just mentioned.

Valuable as strychnia is in the treatment of most cases of phthisis, its results are by no means uniformly beneficial, even under apparently the same conditions.

The results exhibited by cases *wisely selected* as to their appropriateness to be brought under the influence of certain powerful climatic influences or conditions, are certainly more desirable than the ends attained by the use of drugs.

The key-note to the truth of this statement is found, of course, in the phrase, "wisely selected."

Now add to this climatic, hygienic effect the ability which is to-day possessed of scientifically and accurately classifying our cases, and the candid reader must confess that the number of mistakes which are daily made are greatly disproportionate to the amount of light with which the last decade of experience has illuminated us.

Would the following experiment not be interesting?—scarcely an experiment, either: Select promiscuously from the general ranks of the profession as objects of interrogation one hundred physicians, each one having sent abroad, previous to his selection for questioning, one patient,—one hundred patients sent abroad by one hundred wise, medical, miniature courts of justice.

What think ye, my brethren, skilled in the matter of rendering justice in such a court of appeals, would be the purely scientific nature of many of the answers which a

knowing interrogator would receive? Think ye that the answers vouchsafed to him would all partake of the nature of logical conclusions based upon a thorough knowledge of all the factors having an important bearing upon the decision to exile the said hundred victims?—pardon me, I meant to say patients. Echo answers: "What think ye?" To use a hackneyed but still expressive figure, "Let no one put on the shoe unless it fits," and let him not complain unless it pinches.

It was only a painfully short time ago that the following case came directly under my notice: Mr. B., a young man of great promise, became the victim of incipient tuberculosis. His disease was acquired largely by a mode of life which was not in harmony with his physical traits. By discontinuing the work which was to him a positive source of evil and adopting a more healthful manner of living, he was enjoying a large degree of comfort. He represented, however, that unfortunate class of persons whose stock of vitality, even in health, is limited to an amount far below the average. He needed all that he possessed and all the latent energy that could be evolved to throw off the malady which was contending with him for his life. Notwithstanding the fact that it was written in letters of scarlet upon his physique that he possessed not even a modicum of vital energy that could be spared in readjusting the machinery upon which the evolution of his force depended, he was told that it would be impossible for him to live in this climate. A high altitude effect was chosen for him. I shall not say that a cemetery was chosen for him at the same time, for he was interred at home, but I may truth-

fully say that a death-bed was chosen for him. One can scarcely believe that so sad a result was the outgrowth of any intent on the part of his wise medical counselor to have him breathe away his life in a Colorado town. A recital of such mistakes as the above might be multiplied *ad libitum* (or *ad nauseam*, I might better say), but we must to our discussion—make haste to hasten on. How shall we give a reason for the hope that is within us in the matter of choosing for our patients a distant resort? Upon what sound substratum of knowledge shall we found our answers to the interrogations, "Would a mountain climate be an advantage to me?" "What disadvantage would I sustain by remaining at home with all the comforts and advantages it has for me?"

The important matter of selecting cases for elevated climes and elevated climes for certain cases involves a thorough knowledge, *first*, of our home climate, its advantages and disadvantages; *second*, an equally thorough knowledge of the exact therapeutic or hygienic effect of the region selected for the patient; *third*, a full understanding of the great fundamental basic principle through which and by which we may obtain, with much accuracy, such an understanding of our patient's resources as will enable us to select for him the one of those potent influences, either at home or abroad, which will yield to us the richest possible fruition of results.

HOME CLIMATE.

One would suppose that many medical men consider our native atmosphere totally lacking in redeeming features. The plan which they invariably adopt of hastening away from home consumptives under their control leads us, at least, to such a conclusion.

Any climate, I care not how objectionable it may seem to be in some particulars, in which a person has been born and spent thirty, twenty, or even ten years of his life, which immediately preceded his illness, has advantages for him possessed by no other which is not exactly similar to it. We know that a climate of any country which is exactly like that of some other country is exceedingly hard to find, if it may be found at all.

The gnarled and storm-developed giant of the open landscape became so in virtue of the necessity which was imposed upon it to maintain its life under numerous difficulties. The "*crocus vernus*," with its lovely, heartsome hues, and the gay narcissus, the delicately formed anemone and hepatica, the trailing arbutus (*Epigæa repens*, ground laurel, New England mayflower), with its surpassing fragrance and unnumbered admirers, and the modest but exquisitely sweet violet, possess powers of endurance which far surpass those sweet but evanescent products of more genial surroundings. A plant, too, that has been produced under the most favoring influences can never exchange them for any environment more congenial. So, too, the man or woman who becomes a victim of tuberculosis in a climate which possesses more power to counteract those

influences which produce it than any other climate, has nothing to which to look forward. His day of grace is practically a matter of the past. Since we know that our natural climatic environment has less power to overcome certain pernicious tendencies than many other climates, we may use it as a friend by giving that wise heed to our manner of living that will secure us safety and protection.

From the "Sage of Concord,"—"Social Aims,"—we have the following: "Much ill-natured criticism has been directed on American manners. I do not think it is to be resented. Rather, if we are wise, we shall listen and mend. Our critics will then be our best friends, though they did not mean it." The moral lies near the surface. Instead of entertaining feelings of resentment against the land of our nativity, let us use any advantage we may know it to possess in such a way as to make it our friend. As our honored Professor of Physiology, Dr. Miles, used to say, "but I am digressing." It has been correctly observed and remarked years ago that much of the good effect which is obtained from going to an elevated region is due to the complete change in the manners of living which is there adopted by the tourist. Late hours, injurious exposure to the depressing influence of over-heated and poorly ventilated rooms, careless and unhygienic practices, are all abandoned and are replaced by long hours of "tired nature's sweet restorer—balmy sleep;" over-heated and badly ventilated rooms are exchanged for delicious hours spent under the azure vault of heaven—in short, the *now wise*, but recently foolish, patient has substituted for a long list of injurious practices those habits and customs which are highly salutary and recupera-

tive. In many cases so wise and radical a change in life is not sufficient to save them from the "rider on the pale horse." But in those cases where it has resulted in a decided benefit, why was not such wise conduct adopted at home? I wish to state now, with all the emphasis of which I am capable, that in a large percentage of instances such judicious behavior characterizing the home life, with the aid of a wise and skilful use of remedies in the hands of a sound and skilful medical adviser, would save annually scores of lives of those who are foolish enough to wait until they find themselves thousands of miles from home or until the billowy main rolls between them and their native land, before their mode of life *is* marked by that prudence which, if displayed at home, would be to them the difference between life and death. I hope, too, in the name of afflicted humanity, whose interest we are in honor bound to protect with all the skill and knowledge God has given us, that this statement will fall upon the ears of my medical brethren with all the solemnity which truthfulness imparts to it. I am sure it pains me deeply that my assertion cannot be uttered with less seriousness without changing the truth therein contained. But some of my readers doubtless feel at this stage of the discussion like saying to me, "Doctor, are you aware of the fact that the reaction exerted upon the general vitality of the individual by the respiratory and circulatory effect of breathing rarefied air is the most potent influence which we possess in the matter of combating successfully modes of living which would, in other climates, entail upon the individual a fatal tubercular process? Are you not aware, too, that all other meteorological influences

have little or no power to counteract pernicious habits and customs?" To your inquiry I am prepared to give an unqualified affirmative.

It is true that the death-rate from consumption is inversely proportionate to the elevation of certain regions above the sea level. "How do you, then, reconcile the statement that the prophylactic power, which you freely acknowledge to exist in certain regions, is often pernicious when resorted to as a curative agency?" I hope, indeed, that my answer to your question may be as satisfactory to you as it is truthful. The vital machinery of people occupying levels almost among the clouds (certainly above the dew-point) is adapted to its environment. The vital machinery of the natives of our home climate is adapted to its environment. The people living in elevated towns or cities require and possess a much wider range of chest-motion and a much larger vital capacity. I am not informed as to the relation or the ratio which an inch of expansion sustains to a cubic inch of vital capacity. At home, from observations made by me in this city (Philadelphia), I find that in at least three-fourths of the large number of cases whose expansion I have measured, and whose vital capacity has been determined with the dry spirometer, the ratio is 60 cubic inches of vital capacity to every inch of expansion or range of motion which is present.

The natives of highly elevated countries may either possess a much larger ratio of lung capacity to an inch of expansion (it is very probable that they do), or their respiratory muscles may have more suppleness or flexi-

bility, giving to them a wider range. At home, notwithstanding the great weight and height variety which we meet,—say in a thousand individuals,—the relation laid down is present with remarkable uniformity and can be relied upon as a working basis.

To-day a physical director from Ursinus College presented himself at the Y. M. C. A. Gymnasium office for examination. He had a thoroughly well-developed looking chest. He raised the stem of the spirometer to 190 degrees. I remarked to him before using the tape that he was entitled to three inches and a small fraction of an inch expansion. His range of motion was exactly $3\frac{1}{6}$ inches. $3 \times 60 = 180$, $\frac{1}{6}$ of $60 = 10$, $180 + 10 = 190$. It is not often that the rule can be applied with so much accuracy. In a large percentage of cases in which the ratio is under 60, it can be brought up to 60 by training. This is not a digression, but will have a practical bearing on some views that I shall advance later. Permit me to state, too, that we must learn to carefully distinguish between the prophylactic value of a climate and its curative value.

VITAL CAPACITY.

It is right here that much of the trouble lies. While it would probably do an individual who possessed only two inches of chest motion and 120 cubic inches of vital capacity no harm to send him to a lofty climate, that is, in the event of his enjoying a fair degree of health, and while such a region might, in the course of time, be more or less of a benefit to him, it would be folly of follies to subject him to the inconvenience of breathing highly rarefied air after his

lungs became the seat of a tubercular process. In all probability the vitality of such an individual would bear an intimate relation to his vital capacity, on the principle of the reactionary effect of respiratory vigor upon the system at large. Such having been found to be the truth, no good could possibly grow out of sending him to a country in which the atmosphere possessed less density than the one to which his vital forces had become more or less perfectly adapted. Indeed, I do not know what excuse could be offered for the harm such advice would do him.

No climate possesses unlimited power to ward off consumption's ghastly form.

COLDS.

Our climate does not engender phthisis. People, I know, speak of taking a cold which terminated in consumption. It is all a mistake; there is little resemblance between acute and chronic bronchitis and tuberculosis. The foundation for the malady must be laid in bad habits or a deeply-seated vicious inheritance. It is true, however, that either an acute cold or a chronic bronchitis may be the "last straw which breaks the camel's back."

When the vital forces are in so degenerate a condition, there is danger in any climate of some debilitating influence proving to be an exciting cause simply because it was the last link in a chain of morbid agencies, so many links being necessary. Had the action of the cold accused of doing so much harm been the first link in the chain, its influence would have passed by unnoticed. Some other cause than cold, as before stated, would have had the same

effect. Colds are not more harmful than hosts of other influences which are passed by unheeded until the last link is forged, and the physician finds that the end of it all is consumption.

It is true that our atmosphere is very irritating to the inflamed bronchial mucous membrane, but a climate possessing a balmy, soothing effect, because of its placid mildness, lacks the invigorating power of such a climate as our own.

The promotion of the general vigor is a much more vital matter than a soothing local influence.

More sunshine would be a valuable addition to its commendable features, but people do not properly use what they have.

Climates in which a large portion of the time may be spent in the open air possess a radical advantage over the home climate; but do our people make the best use of the open air as a factor?

PHYSICAL TRAINING.

It is with much pleasure that we speak of an addition to our home resources which is exerting a wonderful influence for good. I pause, however, to make the following statement. I believe it to be true that climatic influences are, perhaps, never aggressive in their nature. They are valuable only as they possess factors which militate more or less successfully against those evils whose effect upon the human organism strikes at the very foundation of the evolution of the vital forces. I have tried, in a previous portion of this contribution, to emphasize the fact that we

would do well indeed to behave ourselves wisely. It is expecting too much of any climate that we should look to it to undo the bad effects of a long list of pernicious practices. If the well-meaning but badly misguided representatives of the school of tubercular "bacillosophy" would all use their talents (?) and vital forces in endeavoring to induce the public to adopt more conservative modes of living, the community would likely be thereby much benefited, and the aforementioned apostles would not have to render an account of talents from which they never took the napkin. The individual who states that consumption would be totally eradicated by the destruction of tubercular bacilli at once places himself in the absurd and ludicrous position of saying that modes of life which were, previous to the time of this wholesale "bacillifuge," devitalizing in the extreme, could then be followed with impunity. I hope, too, that my philosophizing tendencies will not offend anyone, although the logical directness of my position may be somewhat destructive to the bacillary equilibrium of the aforesaid school.

Brethren, we must strike at the tap-root of the trouble—take away *the vulture's* food, and the vulture must die. As long as people insist upon converting themselves into food for bacilli, the bacilli will always turn up in due season. It is better that they should, since "life evermore is fed by death." It is better that death should be converted into life, if the form of life is a "bacillus tuberculosis." Pardon me, I could not resist this digression. Let me say now, as briefly as possible, that since we have in the last decade made it possible for a large number of people to substitute

physical training, and I may say mental training, too, for some of our climatic defects, a resort to distant climes is annually becoming less and less imperative. It is the potent influence of counteracting factors which should engage our time and talents and call forth our noblest energies in the work of their propagation.

Scientific physical and mental training is one of our most influential agencies in the work of overcoming degenerative tendencies. We rejoice, too, to know that this influence is spreading with a healthy rapidity, and will in the future work good, which our short insight into the future will not permit us to estimate.

Specific physical training can, in a certain number of cases, be substituted for the effect of higher altitudes, and can be more accurately adjusted to the case in question. I am most willing to admit, too, that its range of influence is yet much limited, a great deal more limited, however, than it should be. The work must be thoroughly under the control of an intelligent, scientific, medical man. The cases selected should be chosen with a thorough knowledge of their physical condition and tendencies plus an accurate understanding of the effect of a given amount of training. In other words, it would be consummate folly for anyone but those possessing an accurate knowledge of this kind of work to prescribe it to his patients. It must be admitted, too, that few have this knowledge. Before dismissing the matter of home-climate faults, I wish to say that I hope that I have not increased any prejudice against it which may have existed in anyone's mind by enumerating each one and giving it its full share of evil.

Is it not much better to meet objections squarely and honestly than it is to try to evade them? It is well to be able to give to ourselves and to our patients a foundation for our course of action which will meet all the scientific tests of the day. I have said nothing about the sudden and marked vicissitudes of our climate. Since consumptives are not engaged in any business pursuits (or, at least, they should not be), this element can be almost entirely overcome by adjusting the weight of the garments to suit the rise and fall in the thermometer and the hygrometric changes, to which many persons are more susceptible than they are to the changes just mentioned.

CLIMATIC VICISSITUDES.

There are few days so persistently wet that confinement to apartments during "dem ganzen Tag," as the Germans say, is obligatory. Remaining in the house for a few days adds a renewed pleasure to being out. Much enjoyment is gained by contrasts or is a result of contrasts. A harsh atmosphere adds a charm to the cozy room, and the overheated room renders the harsh air for a time pleasurable. Modern systems of heating and ventilation have removed many of the objections to indoor life which were once justly attached to it.

A large, airy room, sunny if at all feasible, made as bright and cheery as possible, with due reference, too, to its effect upon the æsthetic faculty, forms an admirable substitutive retreat upon days when the inclemency of the weather makes remaining indoors desirable. Patients in the second and third stages may be better treated in the *house*, if not

in *bed*. An inflamed and irritable bronchial mucous membrane imposes upon its unfortunate possessor the necessity of staying in his apartment upon certain days when the atmosphere seems to be more than usually irritating.

Barring the group of those in the incipient stage just mentioned, even wet days do not make remaining indoors all day obligatory. Indeed, some of our leading authorities warmly advocate the rest-in-bed treatment even in the earliest discoverable inception of the disease. Theoretically, the honest logician must acknowledge that the rest treatment contains much to recommend it to our hearty approval.

CITIES AND TOWNS.

Perhaps I should say, before closing my remarks on this division of my subject, that facts have demonstrated that cities and towns have not proven to be desirable places of residence for phthisical individuals. Large aggregations of people increase the mortality rates from this disease, the mortuary proportion per thousand becoming a constantly rising ratio to the growth of the collection.

Pursuant to this principle, the large number of people which the popularity of certain resorts has drawn to them have rendered said places no longer desirable. The abandonment of places is almost invariably due to this cause. It is strange, too, that in face of a fact which is almost universally recognized, a hospital for consumptives should be located almost in the very heart of our own city (1½ millions in round numbers).

Even the cities located in the regions which confer upon

their inhabitants an almost complete immunity from pulmonary affections are not exceptions to the rule.

Perhaps the difficulty lies more largely in the absence of that rustic simplicity of life which often possesses a charm to stay the approach of even that terrible form which has ravished more households and left more vacant chairs than any single enemy of the race.

Simplicity in manner of life, it would seem, cannot survive the growth of large towns to large cities. It seems impossible that any other effect than the one noticed should attend upon the crowding together of human individuals. Until that rusticity of manner whose influences on life are so salutary shall have been introduced into city life, the wise consumptive should go where he may avail himself of its happy influences.

Let it be understood, however, that when I speak of simplicity I do not mean lack of the "spice of life," which is found in a healthy "variety." I would exclude, too, all approaches to a monotonous routine.

I hope that I have not wearied the interest of my readers by a too lengthy or too ardent defense of my native habitat. I may most truthfully say that I have never given any room in my mind to prejudices in any form, and that before raising my voice in this matter I have given the subject a most careful, long, and painstaking investigation, being led on by a deeply rooted love for truth in whatever phase it may exhibit itself, feeling, too, that no more worthy object may be found in life than the championship of those principles which, though often "crushed to earth" by popular prejudice and oftentimes ignorance, must eventually

rise gloriously triumphant over error in its manifold and seductive forms. "And thou, too, sail on," O ark of Truth! for much that is vitally important to the welfare of the race hangs upon *thy* fate.

We know, too, that as the chariot wheels of time roll on in *their* course, adding to the years that she leaves behind her, that thou, O Truth! must become more and more triumphant, rising higher and yet higher until thou shalt exist crowned and alone in sublime and awful grandeur.

HIGH ALTITUDE EFFECTS.

We have come at last to the second great division of my theme,—*high altitude effects.* It has doubtless appeared strange to some of my readers that I should limit the scope of this article to this single atmospheric influence. I do so because my subject is important enough to occupy not only the scope of one article of ordinary length, but a series of articles. I do so because it overreaches and overtops all other influences in its isolated importance. I do so because, like all really valuable agencies, its improper use and application are just as potent to work untold harm to the individual as its carefully studied and proper application is to work lasting good. Other climatic features possess varying degrees of neutrality of effect, but let no medical adviser lay to his heart the flattering unction that if he has not done his patients any real good by sending them "up," he has not done them any harm. Very often, indeed, it is the "kill or cure" advice which he offers. Fortunate may he consider himself, to whom from a distant land comes the solemn announcement that this patient or that patient has

ceased "to be," who can "gather the drapery of his couch around him and lie down to peaceful dreams" because his advice or judgment in the matter grew out of a thorough knowledge of all the important factors through which his conclusion was formed. In other words, methinks it were well then to feel that the mistake was *unavoidable*.

But wherein consists the potency of those regions far removed from the sea level? Are we in possession of the truthful answer, or is it one of those secrets which nature has not vouchsafed even to the honest, laborious truth-seeker? Fortunately for us, I believe that we are in possession of it, and may use it as a guiding star to our judgment.

Lindsay—than whom we have no better authority—fully believes that the whole explanation of the matter is contained in the secondary effects of breathing, from *infancy* or *childhood*, highly rarefied air, the primary effect of which is a large vital capacity, and not only a vigorous pulmonary circulation, but a general circulation which is characterized by a similar vigor. Secondary to these pulmonary and cardiac phenomena and resultant therefrom, the vital processes throughout the body display an unusual amount of healthful activity, revealed by a full appetite, waited upon by a large digestive capacity and rapid assimilation; resultant from this desirable condition of the food laboratory is the ability to evolve a large amount of nervous, muscular, and glandular energy. The secretory organs are active, and their products more than usually healthful. The reciprocal influence of mind and body under such circumstances is naturally most happy in its effects. "I am sure care is an enemy to life." A less poetical but not less forcible form

of expressing the same truth is, "Care killed a *cat*." Everyone is familiar with the ancient sentiment or tradition that a cat's vitality compared with the amount owned by other animals is expressed by multiplying theirs by *nine*. Anyone, too, who has ever had any experience in separating a cat from its *animus* would, I think, be willing to testify to the large amount of truth thus expressed. The sentiment I wish to emphasize is that the depressing effect upon the mind of a badly nourished body is not calculated to give to life its most roseate hues. Not less injurious is the effect upon the body of a hopeless, cheerless view of our condition.

The person "who never *is*, but always *to be* blessed" possesses a decided advantage over the one who has never been blessed and never hopes to be. Indeed, I imagine that in the latter case there must certainly be only a very thin wall between him and self-destruction. Really, the whole group of consequences growing out of the direct effect upon the pulmonary organs of highly diffused air is almost ideal. It is the ideal nature of the effect just spoken of which has raised in the author's mind an honest doubt as to whether or not too much credit has been ascribed to it. Do not understand me to say that the result is overdrawn or that the amount of resistance to disease which it confers upon the community is fanciful. It is all true. I cannot, however, divest my mind of the idea that such climates must possess a tonic, invigorating effect, which effect is exerted directly upon the organism. I believe, too, that much good grows directly out of that buoyancy of mind and spirit which breathing the purer and more subtle ether

of dewless prominences produces. As I have felt the tonic and invigorating power of other climates, it has always seemed to me that at least part of the philosophy of its kindly influence was beyond the pale of our limited powers of analysis. Is it really true, or does it contain the whole truth, that the effect of say 280 cubic inches of vital capacity confers as much immunity from disease in one climate as it does in another? Is it true, for example, that in our own much abused climate there would wait upon the same number of cubic inches of vital capacity the same happy list of secondary results which accompany it in distant elevations? Immunity from that awful disease in proportion to the number of cubic inches which the person may register, other things being equal, complete immunity to a large number of individuals in the event of their taking any reasonable degree of care of their bodies!

It is not at all surprising that a look of wonderment should follow such a statement, especially when uttered in the hearing of those who do not know that this disease-cursed planet of ours can boast of such "favored spots." "Is there no favored spot, some island far away?" Yes, even for those whose lives have been cursed by an inheritance which their native land is powerless to counteract. Again I ask, will inch for inch of vital capacity offer the same effect at home as it does abroad? It is at this interesting point in my treatment of this subject that I must candidly confess that my knowledge is lacking in mathematical features. Observation after observation has established the truth that there is no constant ratio existing between phthisis and any other climatic feature than the one just mentioned. Altitude

divorced from heat or cold or united to them exerts a potency which any and all other meteorological influences are powerless to exert. Death-rates from consumption in the balmy and in some instances spice-laden atmosphere of the South are as high as are the death-rates the same number of feet above the sea level in the *apparently* harsh and unfriendly climate of the far *North*. Altitude translated into vital capacity—vital capacity translated into units of resistance to the fell enemy of every race!!!

I have the highest authority for the statement that the comparative excess in the number of cubic inches of breathing surface possessed by the residents of dewless elevations is the powerful exorcist which there abides to throw a charm of protection around the fortunate residents.

Do I know that consumption always selects those individuals whose low vital capacity and defective pulmonary circulation with their unfavorable secondary effects have made them a ready prey, or do I know that they were a prey to it because of this? Honestly, from all known analogy, yes. The only climatic feature whose counteracting effect is powerful and constant has been entirely ignored in our study of the disease. I am now forming a scale of figures composed of elevation above the sea level, number of inches of vital capacity, age, and occupation, to determine if this influence is mathematically constant, becoming more and more marked, which is the claim made for it, in proportion to the greater number of cubic inches it has been instrumental in developing. Height, weight, and heredity must of course enter into our comparison. Some time ago, in the February issue of *The International Medical Maga-*

zine, in an article entitled "Redundancy of Respiratory Surface," I expressed the thought that the very wide range of difference in vital capacity which existed among individuals of the same weight and height was, in all probability, the true explanation of the fact that a small amount of pulmonic infiltration often causes more disturbance in respiration—in fact, much more serious disturbance in every way—than a much larger amount in the case of another individual. Mr. A. with his 120 cubic inches of vital capacity and his flabby, undeveloped respiratory muscles, contracts a pneumonia which renders unfit for use 40 inches of his capital. He must, of course, carry on his respiratory function with 80 cubic inches. Mr. B. with 240 cubic inches of capital contracts a pneumonia which usurps 80 inches of his territory, twice the amount of involvement from which A. is suffering—balance, 240 — 80 = 160,—twice as much area affected, twice as much sound lung capacity left, with which to perform the respiratory work. Is it at all surprising that A. should suffer more with his apologetic stock of respiratory surface than B. suffers with a double amount of involvement? Would it be at all surprising, either, if under such conditions Mr. A. should refuse to get well under a wise plan of treatment while Mr. B. gave a very satisfactory response to a similar method? The question contains the answer. I firmly believe, from the amount of vigor which I have seen imparted to the general health by a large area of respiratory surface, that if two individuals enjoying, as nearly as we could determine, the same degree of health, were subjected to the same devitalizing influences, the one possessing a third or a half more vital capacity would offer

a much greater amount of resistance, and might not contract phthisis, while the other would in all probability become a victim both to disease and death. Why not? Is there any reason why what has been observed to be a law of effect in other climates should not be a law of effect in this climate? A short time ago, a squarely built, middle-aged man weighing 185 pounds appeared at Central Branch, Y. M. C. A., Fifteenth and Chestnut Streets office, this city, for *examination*. The vesicular murmur throughout his chest was lacking in intensity, his range of motion was small. I was much surprised to find that his vital capacity was only 110 cubic inches.

I asked him if he ever suffered from a distressing sense of constriction over the anterior region of his chest, and a feeling, too, upon making slight physical exertion, that the air was deficient in oxygen. He answered in the affirmative, saying also that the action of his mind was sluggish and that it was difficult for him to enter into anything with any interest or pleasure. His vital forces were acting in a sleepy, lazy manner.

He was requested to take a few inspirations in such a way as to call into active use every portion of his lungs. The effect was almost magical. You may hasten to say that he had not been accustomed to taking deep inspirations. Quite true. That only proves more conclusively that this result, of course to a less extent, should have been constant. Some one says, however, that the symptoms which he manifested and his very small vital capacity, especially in proportion to his general physique, were only a coincidence. I am not at all accustomed to basing a conclusion

upon observations made upon a single case. I have noticed the same combination so frequently that I know that it is more than a coincidence—it is *cause and effect.* The density of our atmosphere enables people with a very low comparative amount of respiratory surface to breathe it with *seeming perfect comfort.* I say seeming comfort, for I believe that it is comfort to them because they have never known any other standard of comfort, just as an object may appear very beautiful to one who has never beheld anything really beautiful—one glance at the real illustration changes at once his standard of beauty; so I believe that a short period of experience of the comfort enjoyed by being able to take into their lungs double the amount of air, it might be in some cases, would at once cause them to abandon their former standard of comfort. A man with a small lung capacity probably knows nothing about the pleasing effect resultant from the reaction of a very large capacity. Again, a man may imagine himself to be enjoying the fullest pleasure of perfect health when a residence in another climate or life under different conditions may convince him that he was self-deceived in the matter, and that he might have been carried to the cemetery without ever being undeceived; so that feelings with reference to certain conditions are very apt to be misleading.

We come now to the last and, perhaps, most important division of our subject—namely, principles for the guidance of our selection of patients amenable to high altitude treatment versus patients not amenable to such treatment; not only not amenable to the effects of rarefied air, but possessing *distinctive characteristics* which would render such

treatment highly injurious. I hope that it has begun to dawn upon the minds of those members of the profession, who send their patients away to more or less distant lands with a regularity which would indicate that any and all cases not *too far advanced* are jumbled together by them into a homogenous mass, that our much abused climate really does meet therapeutic indications which may not be met in any other climate not exactly similar.

Keeping in mind the fact that the great fundamental principle underlying all selection or classification of cases in any stage of the morbid process is the amount of resistance possessed by the individual or the amount of latent energy we may confidently hope to call forth, we shall note the comparative amount of outlay required by climates differing widely in density. The ratio is, of course, an ascending one, more difference existing in expenditure the higher the elevation. Home climate conservation—no readjustment of the patient's vital energy, a smaller amount of force required in the performance of the respiratory function. In what more awfully responsible situation may the medical man find himself than being called upon to weigh the chances of his patient in favor of life or death?—life on one side of the balance, death upon the other. If by weighing the possibilities in the case, I may place my confiding ward in the side of the balance in which life with all its glorious promise is found, what excuse shall I render to myself, or to those reposing an implicit faith in me, for neglecting anything that will enable me to properly adjust the balance? Again we say, that our best energies and most acute analyses must be directed to correctly determining

our patients' resources. The *burning*, the vital question must ever be—how much vitality will this patient or that patient be called upon to expend in a readjustment of his mode of living? Changed environment—what vital significance has it for him? More oxygen supplied to the blood and the vital forces in proportion to the energy expended, less every-day friction, home and its comforts affording better opportunity for attention to important details, greater watchfulness by a larger number of interested friends, and, in many instances, more successful efforts to meet the requirements of an often capricious appetite.

Last, but not least—at least I hope so—we mention the family doctor; be he a blessing or a curse to the patient, conventionality requires us to mention his name. He very often has the advantage over other physicians. Just how much use he often makes of his golden opportunities to become familiar with the vital points in the case shall not be made a subject for present comment. We may speak of the matter later.

Family doctors (great blessings if skilful diagnosticians and realizing the limitations of the general practitioner) are such wonderful inventions that I sometimes wonder that the family does not have them patented. I presume that the expense is the main drawback. It is a pity, too, since it would be such a desirable consummation if some of the mistakes made by the ignorant and careless ones were limited to only one household.

High altitude expenditure as an introductory feature to treatment,—in other words, a present evil in the hope of a future good, a greater or less amount of force expended

in the readjustment of the vital economy—principles determining the amount will be discussed later in the treatise—more fuel consumed in the vital processes, more heart energy expended, a less amount of oxygen supplied to the tissues in proportion to the nervous and muscular energy used: we are speaking now, of course, of expenditure made *necessary* in the process of readjustment.

It is scarcely necessary to state that the great truth involved in the above statement makes the matter of the nicest possible estimate of the individual's resources a matter of supreme moment. Having determined this matter with all the *accuracy* that the *circumstances of the case will permit*, we are confronted with the question, May I safely withdraw from the resources with which I must cope with the enemy the amount thus indicated, or would such a loss give to the disease a sure and fatal advantage? We have already laid down as a safe and important conservative principle the rule that the *successful* application of high altitude treatment requires as a foundation for its operation a larger amount of vital energy than our own climate requires.

In consideration of the vitally important truth that a large percentage of cases have no resources to throw away upon any process of readjustment, the difference required to live in a distant climate rather than remain at home has in many, many sad instances turned the scale of possibilities in favor of death. The author will be fully pardoned for his enthusiastic but kindly effort to inscribe indelibly such a truth upon memory's tablets. The subject which is now engaging my time and attention is one that lies very close, indeed, to my heart of hearts. There is something to me so

wonderfully sad in the contemplation of the deceptive forms in which this fell enemy to all that is sweet and holy in human prospects clothes itself. Witness how often it transforms its victim into an object more beautiful than the form in which the mantle of health had unfolded it before it was laid upon the altar. See how the fires of youthful hope burn with a brighter luster. Tell me, thou deceiver, why dost thou come to mock us so?

> "The lamb thy riot dooms to bleed to-day,
> Had he thy reason, would he skip and play?
> Pleased to the last, he crops the flowery food
> And licks the hand just raised to shed his blood."

Perhaps it is well that thou, too, shouldst feed thy lovely victims upon the flowery blossoms of hope until the time when thou shalt claim them for thine own is very, very near. Thy stern, cruel form is not without an element of mercy. We must thank thee that the "hope which springs eternal in the human heart" has been vouchsafed to those whom thou hast chosen for thine own. Let us see to it that the patients whom we send away be not lacking in that *determining quantum* of resistance the want of which will give them nothing to look forward to in a distant resort but the speedy approach of death, especially those who are compelled by force of circumstances to go alone. Everyone knows, too, that no more ardent wish ever filled the inmost heart of the departing spirit, than the wish to have near it the one or the ones around whom the fond tendrils of its affections entwined themselves most tenderly.

Let my readers not forget that the high altitude effect to

which our attention was given in the former part of this *subject* was the effect which such a climate exerts upon the natives, or those who have become acclimated. No greater mistake could be made than confounding the effect exerted upon healthy individuals with the effect exerted upon consumptives sent from other climates. As before stated, one effect is prophylactic and the other is either remedial or non-remedial. It is almost impossible to find cases upon whom it is neutral. A neutrality may exist only for a short time at best, the balance is quickly struck in favor of either life or death. At the risk of too much repetition, I assert again that the prophylactic influence of high altitude effects is much superior under similar modes of living to that of our native atmosphere. The curative agency of the former cannot, in a large number of instances, I believe, be exerted without an expenditure of force which would not be required at home, and which, as before mentioned, if expended, would turn the scale in favor of disease.

TANGIBLE INDICES.

We come now to the tangible indices of the varying degrees of resistance possessed by tubercular patients. Will such indices manifested by each patient, *if rightly used*, enable us to so gauge accurately the amount of vital resistance which he or she possesses, in such a way that our counsel will be invariably attended with the most desirable ends whether we detain our wards at home or exile them?

Tangible expressions leading to correct estimates and best possible results!

A compass to guide us safely across such a sea of uncertainty to the sweet haven of health, the nearest approach to health or, at least, the greatest length of days to the patient!

A way safely through the labyrinthine windings in which we so often find ourselves! A solution to a problem which is often more intricate than the brow-contracting perplexities of calculus!

Yes, with few exceptions. "But, my dear Doctor, are not your promises deeply tinged with presumption?" Modestly speaking, I think not; most of all, I hope not. The frequent occurrence of undesirable results is usually an outgrowth of a failure or neglect to use all of our available light. Turn on the light, brethren, turn on the light. Frequently, at least, the matter is not so difficult as it may seem.

The adjustment of any climatic, therapeutic measure to the wants of the vital requirements of the patient not only involves a full and accurate knowledge of the remedy to be applied, but a careful and skilful determination of the patient's condition. Let us carefully consider *seriatim* all the elements, favorable and unfavorable, which enter into our estimate of the amount of resistance still retained by our patients.

So-called Vulnerable Age.—The effect of this element has, I believe, been very incorrectly estimated. To say that the period between twenty and thirty is a decade characterized by the greatest vulnerability is to make the statement that a less amount of resistance may be generated by the vital economy at that age than at any other age or decade. If it can be shown that the patient's resources are not lacking

at that time in that form of activity which is directly translatable into resistance, then the ages spoken of are neither more vulnerable ages, nor are they less favorable to recovery. Nay, verily, I believe a patient is as much more liable to recover at that age, as he is capable of generating a larger amount of force at that age. During the period usually spoken of as the vulnerable one, cellular activity is thoroughly active, and such activity is not any more inviting to tubercular processes than it is to other devitalizing tendencies. But some one responds, that activity of the epithelial elements is peculiarly favorable to the phthisical process, in fact, a noticeable proportion of consumptives suffer from the catarrhal variety. Admitted that tuberculosis is in a very large number of instances characterized by an unstable condition of the epithelial elements—in other words the process is largely catarrhal. But do such tendencies manifest themselves to a dangerous extent in an individual whose vitality is otherwise up to the physiologic standard? The balance between waste and repair must always be struck in favor of the former, before any such epithelial activity has ever manifested itself or ever will, that is, if the analogy based upon all the years that have gone before is worth anything to us. Disturb this vital balance in the twelve-months-old infant or in the man who has reached his three score years and ten, and the same specific activity on the part of the epithelial elements lining the alveoli will soon be just as plainly shown. The keynote to the whole situation lies in the matter of the liability to bankruptcy of energy between the years mentioned—bankruptcy from foolish outlay. Now we know as a historical

fact and as a matter of everyday observation, that in many instances the best work of life is done in the third decade. There are perhaps no ten years of life in which larger amounts of energy have been evolved and expended, indeed, men often draw largely in the period under consideration upon what ought to be and would be future resources if not used before the physiologic time. When a person has become a victim to phthisis at the age of from twenty-two to twenty-five, which is considered to be, and perhaps is, the most susceptible age, I fully believe his statement that his mode of living has been marked by a much less amount of wisdom and a more rapid use of his vitality than it was previous to that time or probably would have been had he contracted the disease after that time. We know that it not infrequently happens that people with hereditary tendencies and a full conviction that certain periods of time are danger periods, pass through them safely by a prudent mode of life only to become victims later in life by careless expenditures that would have had the same result earlier. The ambitious college boy or girl, for example, spurred on by pride and thirst for honor, either becomes a victim or lays for himself a foundation which later in life turns the tide against him. Twenty years, twenty-two years, and very often indeed, a still larger number of years, have not brought to the hungry aspirant for honor, fame, wealth, or power that discretion which becomes his guardian angel in later years. His earlier years, while not notable for wisdom of action, are more a product of parental control. Life's realities do not weigh very heavily upon his youthful mind, his blood has not been fired by a contemplation of the glowing

prospects which seem so fair to behold when viewed by his inexperienced eye. "Ambition" has not yet lifted his lowly window, it may be, has not yet stepped in to lure him away by fixing his eyes upon the rainbow hues of greatness, which seem to span the sky of his destiny.

More of life's follies are enacted between the ages of twenty and thirty than in all the years which have preceded them, or followed them. Youthful follies and indiscretions and consumption are, alas! only too often translatable terms. "A man is either his own physician or a fool at forty." Mistakes made before that time are very charitably termed foolish, after that the cloak of charity is thrown aside, and rightfully, too, and the foolish man is either a man in prudence or he becomes the out-and-out, plain, unvarnished, Anglo-Saxon "fool." In all charity, I think society allows him too much latitude in the matter. Do you not think that a man, or woman, too, if you choose, should be considered to have crossed the boundary line at thirty-five? I see no reason why prudence and wisdom should not be expected of him at thirty. Since, then, no Nemesis dwells in the years *per se*, I see no cause why measure for measure of vitality should yield to treatment and best use of environment less favorable results at twenty-two than they would at forty or later in life. Do not misunderstand me—I say measure for measure of vitality. Indeed, latent energy is more easily called forth and into requisition at twenty-five than it is at forty or forty-five.

The organism is more responsive to temperature agencies. While I am free to admit that a constitution is more fre-

quently broken down at twenty than it is at forty, I feel that I may as truthfully say that it is more easily built up, providing a too extravagant course of riotous living has not preceded its downfall. Stated in a nut-shell, the youth of twenty-two or twenty-five, other things being equal, will probably yield to our remedies as good results as are yielded to them by a more advanced age. It was only a short time ago that two consumptives in the same block were placed under my care—one a young man *twenty-two* years of age, the other a man of sixty. In case No. 1, the disease was the result of an occupation which causes a much higher death-rate from phthisis than any other occupation is known to produce, indeed its effect seems to have a perniciousness for which it is hard to account. I must not say, either, that the occupation was the whole cause, as his manner of life aside from his trade (printer—lead-type) was in no sense a counteracting agency.

The disease in the old man was not a result of any marked imprudence at any particular time in life; notwithstanding this, the youth gave to my remedies a much more rapid response. I was able, too, to hold the disease in check much longer in the case of the young man than I was in the old man. Conditions for improvement being equally favorable, I have frequently noticed similar results when treating at the same time almost the two extremes of age. Think ye that the age of fifty or sixty would bear the brunt of that prodigal expenditure of force of which we have just been speaking any better than the youth of twenty-five or thirty? Is it reasonable or scientific that the evolution periods of life should yield less resistance to destructive

tendencies than the involution periods? Methinks I have only to ask the question in order to receive a negative reply. Permit me to cite to you another example, representing a large class of consumptives. The blooming girl of tender years and a simple, uncomplicated mode of living, arrives at length at the eventful time when her fond, ambitious mother and proud father deem her sufficiently developed to make her début into society. She is delicately organized, we must admit, but her vital expenditure up to this time has been less than the amount of force she was capable of generating, so that the soft, subdued pink of her complexion is relieved by the deeper and more exquisite health shade which mantles her cheek.

Every movement is graceful and artistic. Her young soul shines out through her beautiful eyes with a bewitching light. Her conversation is characterized by that vivacity and sprightliness which gives an infinite charm; devotees throng around her to bask in the soft sunlight of her presence, parental hearts are justly filled with pride. She becomes carried away by the excitement and fascination of the situation in which she finds herself. Unconscious of the direction in which her footsteps are tending, she is lavish in her *nightly* expenditure of her force (night, we all know, is nature's time for the restoration of the wasted energies); time rolls on, the rose tints which were once hers have been replaced by a universal pallor. Some of the luster has gone from those eyes; her movements, while still graceful, possess a languid slowness which the observant eye notices with a feeling of profound sadness. Months pass in their rapid flight; again those cheeks are mantled

with a flush, but it is the fatal blush of that awful form so much dreaded. Once more those eyes have become most wonderfully brilliant, but, alas! it is a brilliancy whose presence excites in the hearts where pride and hope had been an awful fear. Languid and still more languid grow her movements, less and less vivacious becomes the style of her conversation, etc. Was it a vulnerable period? Was it youth which worked such changes, or would such a set of influences to which the delicately organized maiden exposed herself have worked to her the same harm later in life?

I may boldly assert on the strictest scientific basis that one year is a vulnerable age—seventy years is a vulnerable age. The word has no scientific meaning at all, except as a statement that the human organism may at any time in the history of its life become a habitat for tuberculosis. The great fundamental truth in connection with the presence of the malady at any age is contained in that happy expression—*physical bankruptcy*. To repeat it, no more happy, fitting, and scientific word may be used. The *vital adjustment* existing between waste and repair has been disturbed to such a degree that the balance of potentiality has been struck in favor of waste. No age or period of life is exempt from such a fate. I cannot refrain from stating here that if the great truth resident in the phrase—physical bankruptcy—were given its rightful prominence before the public, laity and non-laity, those harmless little microscopic apologies for living forms might be allowed a period of respite with incalculable benefit to the race in the race with phthisis, however much quibbling may be done regarding the exciting etiologic agency involved in the production

of tuberculosis. All are willing to admit—unless the patient died suddenly from fatal hemoptysis—that death to consumptives has been the sequel or closing scene in the drama of a *retrograde* metamorphosis of the vital activity with which each cell was originally endowed. In some cases it would seem that the balance before the disease manifested itself has been more disturbed than it was in other cases. What individual was ever known to contract consumption when he was daily gaining in weight? If any medical brother has ever known of such an interesting occurrence, I would be highly gratified to hear from him. Every chest-man with any experience knows that the whole history of the disease is marked by a struggle on the part of conflicting forces. The recuperative forces hold their ground bravely, nobly, for a long time, it may be, then, as if worn out with the attempt to gain the day and plant their loyal colors upon the ramparts of health, they seem to retire from the conflict, causing the cheering star of hope which had arisen in the minds of physician and friends to set for a time behind a dark cloud of fear and despondency. But, behold! it has arisen once more to shine, perhaps with more brilliancy than before, even to abide, testifying that it is not well to give way in any case too early to fell despair. Indeed, death as a result of starvation bears a stronger resemblance to death from consumption than it does to any other disease. Every gland, muscle, nerve, and brain-cell—in fact, every microscopic atom of the body—is not more surely involved in the former process than it is in the latter. It is remarkable what a strong resemblance to natural sleep some persons manifest, too, as a post-mortem appearance.

Nervous exhaustion may destroy life and leave the muscular tissues well-preserved. Pain exhausts the respiratory center, the cardiac center, or it may be that the nervous system ceases to functionate as a result of the amount of force it has expended in the enervating agony which the patient has undergone, but all this is different from consumption and starvation. Indeed, although brought about in a different way, the results are strikingly similar. Death in one case because there is no food to feed upon; death in the other case because the tissues cannot feed upon the food provided. The resemblance is also strikingly manifested in those cases of advanced inanition which have come very near the river bank and then returned. The power of the tissues to functionate had become so nearly lost that only a small amount of food can be at first digested. However much knowledge we may lack regarding the nature of the change, we know most assuredly that it never ingrafts itself upon that change, which expresses so much and confesses so little, until the vital processes have lost their ascendency in the matter of waste and repair. Death in consumption is ever and always a result of extreme and fatal exhaustion of every microscopic part of the general fabric. But what has this long discussion to do with proving my position that there is no vulnerable age in the usually accepted sense of the term? Much in every way. I started out on the truthful basis that any process that is capable of destroying the correct balance, varying at different periods of life, of course, existing between opposing forces is capable of producing phthisis. Now, then, evolution of cell-life up to a certain age is a *progressive process*, that is, up to a certain age each cell

must not only evolve a certain amount of nerve force, muscle force, gland force, thought force, memory force, or esthetic force, but it must do more; it must daily add to its size and, in the case of some cells, not only to their size, but they must, by the potentiality invested in them as a primary endowment, raise their form of activity from a *lower* to a *higher* and *still higher form*.

What evidence have we that at the age of twenty-two, we will say, in the case of a young man or woman who has become a victim of tuberculosis at that period, the individual cell has begun a retrograde change, or that at the age of sixteen or eighteen or twenty-one more force is being evolved, or that more force is being evolved at twenty-three or at thirty-one than is evolved at twenty-two? Does it not seem rather absurd, to say the least, that during the ten most valuable years of a man's life a halt or retrograde change in a process of evolution looking to the perfection of the mind and body should exist? Now, we know that very often, indeed, the best work in life is performed between the ages of twenty and thirty. After thirty the vital forces do not assume a more active form, but rather exhibit different expressions of activity. Part of the memory force of twenty may be changed into judgment force at thirty or thirty-five, or some energy spent in the exercise of the imaginative faculty may now be used in the processes of ratiocination. Up to twenty years, more energy is expended in the actual growth of the various parts of the organism. It is not the real activity, which varies much before twenty-two, it may be, or after thirty,—it is the direction in which it exerts itself. So we see that

the ten years of life to which nature has given the capacity for generating an amount of energy which is equal to the amount that may be generated in any other decade, may not be called vulnerable years because not lacking in that endowment which renders the tissues vulnerable. Deprive an infant twelve months old of a sufficient amount of food, add to this the depressing effect of bad hygienic conditions, destroy the balance of power which nature intended that it should have, and your infant has all the conditions of vulnerability possessed by your so-called youth of twenty-two years. Destroy the balance which nature designs the man of three score and ten to have, lower his power to digest and assimilate, diminish that activity of life exhibited by cells at this age; what have you? Vulnerability. Now, as to the matter of developing resistance in the patient of twenty as compared to the patient of forty, there is one point in the matter of estimating our counteracting forces, which might seem to give an advantage to the third decade of life. More nerve force may, perhaps, be evolved at that time, but while nervous degeneration, in all probability, is an immediate cause of consumption, as ably advocated by Dr. Mays, nervous exhaustion is not required more than an under-production of nerve force. Since neurasthenias and that form of nerve degeneracy which is concerned as the etiologic factor in phthisis are not closely related, or, at least, do not seem to tend in the same direction; and since the activity of the nervous processes may be readily stimulated between twenty and thirty, this objection will not obtain.

This argument, too, would render the ages of sixteen or

eighteen more unfavorable for good results. However, they are not. I hope that I have not prolonged this point to a length that has been wearisome. Some of the essential features in the real nature of the trouble are contained in the elucidation of my position and could not well be passed by. Nothing but a positive proof that nature has not endowed the organism with as much power to generate force during the so-called vulnerable years (and we have the strongest proof of the opposite) would warrant anyone in using the word vulnerable or in saying that such a decade falls below any other decade in the power of combating degenerative tendencies. Regard these years as a decade lacking in sober judgment and wisdom of life, which characterizes the later years. Look upon the years preceding twenty as lacking in that feverish unrest and preparation for the great work of life, with its numberless avenues for wasting the precious resources of such a golden decade, and you will, I believe, occupy the vantage ground of truth. In that rush and feverish haste which modern civilization arouses in the conduct of men of the soberest judgment, it is not at all surprising that the hot blood of impulsive youthhood, especially at a period when judgment is in swaddling clothes, should very frequently manifest a thoughtlessness and prodigality of expenditure which either numbers him with the great army of consumptives or lays the foundation for an invalidism upon which some indiscretion of later years may ingraft a fatal form of tuberculosis.

The consuming fires of a fettering ambition, the tyrannical sway of thirsts, hungers, and the uncontrolled insatiability

of an ill-regulated life would, in countless instances, explain the vulnerability of the victims thus attacked.

INCIPIENCY.

We come now to the consideration of incipiency as compared with the second and third stages.

In comparing an individual's chances for recovery with the probabilities of another individual, the patient in the third stage may still have more resistance left, and resistance, too, which we may use as a successful factor in our work of fighting his foe. It is scarcely necessary to state that a patient who has retained enough of vital energy to cope successfully with the enemy even when the morbid process has produced considerable destruction of tissue, would, under circumstances equally favorable, have thrown it off sooner in the incipiency of the pulmonic lesion, had his mode of life and the therapeutic measures, medicinal or climatic, been as well adjusted to gaining the ground of conflict for health; the third stage would not have been reached, and the day would have been won in the first stage. As a general rule, this statement is true. The exception will be commented upon later.

It is, indeed, most difficult to state just how large a percentage of cases might have been treated successfully in the first stage where an effort to arrest the progress of the disease in the second or third stage was fruitless. As Dr. Flint has shown, I believe, rather conclusively, that at least a certain proportion of cases recover in virtue of an intrinsic tendency on the part of the disease to leave its abode. We

must, at least, be honestly guarded in declaring that had such an individual come under our care in the preceding stage, we might have saved his life by treating him properly at home or by *properly* sending him abroad. I believe that the better, the wiser, and the more charitable plan is to take a thorough inventory of our patient's possibilities in whatever stage he may come under our notice, especially since patients ought to be either retained at home or sent abroad in any stage; certainly, we must do one thing or the other! I believe, too, that a correct inventory of force will enable us to apply climatic therapeutics in the attainment of health just as successfully, in not a few instances, in the third stage as in the first or second.

CONTRA-INDICATIONS.

Checks or contra-indications for sending the individual to an elevated region (when I say elevated region, let it be understood that I mean any region the *comparative* density of whose atmosphere will entail upon the patient's resources an appreciable expenditure of vitality). While slight differences in density are, of course, not without their ratio of effect, we may not so nicely adjust the balance as to be able to exclude them in favor of our individual's native habitat. Restraint or non-restraint in the amount of local involvement;—let no medical brother make the mistake of believing that because he has been fortunate enough to have the control of cases having only a very slight local involvement, that all such individuals may be successfully sent away. No greater error could be made, and yet it is

made with painful frequency. Rather let the effect of a small amount of involvement upon the individual's general resources engage your best energies.

Concerning the ability to make a skilful diagnosis, I would like to write it in letters of scarlet that if there is one index more than another index that should be to us the red flag of danger, it is the extent of the constitutional disturbance a *small*, local, pneumonic involvement produces.

A marked evidence of intolerance may be overlooked only with the most disastrous consequences. Why? It is either an evidence of intolerance on the part of the patient's powers of resistance or, what is equally important, an evidence that the tangible pulmonary expression of the morbid process is only a small part of the disturbance which is present, and which is, for the time being, escaping our powers of detection. It matters little what interpretation you put upon it, both conditions render the application of a distant climate a matter of extreme danger. I may truthfully declare that the only safe rule to adopt with any and all such patients is to keep them at home. Given a small subclavicular involvement, just enough to produce a slight impairment of percussion resonance, not even rales, or nothing more, it may be, than prolonged expiration—used in its technical sense, a small vital capacity, a previous history of a very limited power of endurance to every-day influences and, associated with the aforementioned physical signs, great debility, a large amount of cardiac disturbance, an evening temperature of 101° or 102° F. which also shows a marked tendency to be persistent, and I can promise you that your chances for arresting the

progress of such a manifestation of morbid antagonism to your patient's resources is about *nil.* I know of no graver omen than a small and sometimes non-progressive and insignificant lesion, which is producing a constitutional effect largely disproportionate to its local extent or present *tendency to be progressive.* It is strange that a non-progressive form of local lesion should act as a reflex irritant for months and months before it shows a tendency to extend its limits, but strange as it may be, we meet with such cases, and none should make us more religiously conservative in our advice. We know not at what hour the local formation may light up and carry away the patient with appalling rapidity. Such cases, upon every principle of humanity and common sense should be retained where they may receive the last kindly acts from friends and relatives, or relatives and friends.

We will speak now of another important check to sending patients away in the first stage of the *pulmonary invasion.* Those belonging to this class usually exhibit the signs of a general bronchitis, which has expressed itself, with more or less *distinctive intensity*, either above or below the right or left clavicle, or, it may be, in both the infra- and supraclavicular regions in either the right or left apex. Very early in the process the only evidence given to our senses that the malady is manifesting a selective affinity for any particular area, is a more or less circumscribed space over which harsh, rude, or bronchovesicular *inspiration* may be distinctly heard, the expiratory murmur never having undergone any change. Indeed, this external expression of an internal lesion may remain stationary for

months without giving to the careful explorer any evidence whatever, that it has extended beyond its original confines. After repeated examinations, we may notice some slight impairment in the percussion resonance over the area designated or mapped out by the rude inspiration just mentioned, or we may notice, in addition to this, a tendency on the part of the expiratory sound to manifest the same changes shown by the inspiratory sound. These sounds may remain stationary for months. Now, the vital point to which I wish to call the attention of my readers is that the sudden development of general nervousness or irritability of the nervous system at large, will, in all probability, be soon attended with rapid local changes, loss of appetite, digestion, and assimilation, and serious intestinal complications, growing out of this as a direct effect. We note rapid emaciation and the speedy approach of death ushered in by a low, rambling form of delirium.

Let me here lay down as a most valuable conservative principle that all marked disproportion between the nervous symptoms exhibited and the extent of the pulmonary involvement ought to serve as a most important check in the matter of applying rarefied air as a therapeutic measure.

It will probably be only a short time at best until the disproportion spoken of will display a symmetry of effect in the rapid destructive lesions following in its wake, hence the importance of the greatest care in promising aught to patients or friends from the effect of another climate. This will hold good in any stage. A patient in whom the local process, after running into the third stage with the effect of producing, perhaps, a small-sized cavity, which has

become quiescent or entirely inactive, comes to us for advice. Probably the immediate cause of his visit was some impairment in his general muscular tone. The fact that he has been recently becoming quite nervous may have escaped his notice, or he may not have thought of it as having any special significance. To us the import therein contained is a matter of *supreme moment*, and may not be overlooked in determining upon a course of climatic treatment most suitable to his condition.

A small local involvement attended with much disturbance in the circulation, rapidity and weakness of the pulse, a tendency to palpitation and dyspnea, not due to respiratory compromise, is an unfavorable index of intolerance, and might have been introduced under our discussion of that feature of the malady.

Other things being equal, the patient having acquired the disease under the condition of poor quality of food, an insufficient amount, or under conditions of exposure to cold and wet, hardships, or harrowing cares, and disturbing and devitalizing griefs, especially when the clouds have not been rifted and the bright blue sky does not shine through, is much less amenable to restorative agencies of any kind. The similarity between death from starvation and death as a sequel of phthisis has been explained. No more sure foundation for the certain and fatal issue of tuberculosis may be laid than the basis of partial death of the tissues resultant from the use of food not suitable to the digestive capacity and limited powers of assimilation or of an insufficient quantity. A man or woman who is part corpse and part a living entity as the result of a

pathetic system of semi-starvation has little resistance with which to meet such an enemy to life as tuberculosis. The activity of the individual cell cannot rise above the slow starvation environment by which it has been reduced to so low an ebb. The aggregate of resistance cannot rise above the form of life displayed by the unit of force.

A tubercular sequel of blighted hopes and of organic machinery out of tune with the world, and its immediate every-day soul-harrowing friction, is not amenable to the most powerful climatic balms,—the spicy "balm of Gilead," methinks, would even be applied in vain. No air so balmy, no sky so blue, no zephyrs so flower-laden, no music so harmonious, no sunshine so inspiring as to arrest the process of such a malady when so sadly conditioned or constituted. Take from any and every personal expression of life the desire to live, or engraft upon life indifference to living, and the most potent curative influences advised by a man or a woman of the most comprehensive knowledge and the most profound judgment, will be, by the absence of such *vital* stimuli to the vital processes, transformed into factors as powerless to cure as the infinitesimal dilutions of the fabled homeopathist.

Small Vital Capacity as a Check to Rarefied Air Treatment.—We regret exceedingly that almost all that we know with reference to this influential factor (that is, as possessing much potency in our own climate) is the result of analogy. Its power, though, has been so well established abroad, and the ratio between inches of lung capacity and reactionary resistance has been noted to be so constant that we are, I believe, scientifically safe in taking this physical possession

into careful account in our estimates of the probable resistance our patients may have as determining the application of therapeutic agents. The writer has known, as a matter of personal observation, that high altitude effect has had, in cases which were considerably below the average in the number of cubic inches of respiratory surface, a most pernicious influence, lighting up a rapid local extension, disturbing the circulation to a marked degree, and producing rapid emaciation and fatal exhaustion.

From an extensive knowledge of the widely differing amounts of respiratory surface which men of the same *height* and *weight* possess, I am thoroughly convinced that much harm, which might have been avoided, has been done by ignoring this principle, and which may be avoided by a careful study of the amount of resistance it carries with it. Other things being equal, then, the smaller the amount of vital capacity possessed by any individual under consideration, the larger the amount of energy that must necessarily be expended in the *re*-adjustment of the vital economy. Now this readjustment is often not performed with the result intended for two general reasons. One is the *large amount* of force required in its performance. Such cases, too, are especially apt to lead the unwary astray. It is not infrequently the case that, owing to the density of our atmosphere, suitable hygienic environment combined with the proper medical management, with perhaps, too, only a small local involvement, the appetite is fairly good, digestion and assimilation are active, and the patient promises fair to yield to a loftier region most desirable results. If the tape, however, indicates two or 2½ inches of expansion, and the

spirometer 130 cubic inches of respiratory surface, we must calculate the climatic effect upon resources from which we must subtract a comparatively large amount of resistance. The amount, then, which new environment will deduct, will bear a constantly ascending ratio to the increasing distance of the location of the resort above the level of the sea and the smaller and still smaller respiratory surface—elevation very high, vital capacity and range of motion very low, amount of force expended very large.

As the number of units of resistance expended in the readjustment of the vital economy is to the height of the elevation and a small vital capacity, so is the balance of resistance to the amount or units of resistance thus expended.

All cases of incipient phthisis which have recently come under my notice have been remarkable for the small amount of breathing space which they possess. To-day, I was somewhat surprised to find that a young man of twenty-three years of age and with only a very limited involvement raised the stem of the spirometer to only 90 inches. He was, from his height and weight, entitled to at least 200 inches. His temperature range and general muscular relaxation bore an inverse ratio to the amount of lung capacity he possessed. Considering the matter of a low range of respiratory surface as a wholesome check to sending away the patient, let me say that from all known analogy, and from the results of my experience, which I confess is not as extensive as I might wish it to be, yet extensive enough to be conclusive, I know of nothing which should give greater weight to the conclusion that high altitude treatment would not be applicable.

Take into account the low rate at which the tissues must live by being deprived of that amount of oxygen upon which the metabolism of energy depends, and the absolute inability to breathe a much more rarefied air without the consumption of an amount of precious fuel which would cause a most destructive local outbreak with all its dire consequences. Such an invaluable index or check may be overlooked only with the most disastrous results. The tongueless but not silent marble, both at home and abroad, has in many, many instances testified to the truth of the statement just penned.

I almost omitted to say, too, that I have tried the use of the rarefied air treatment in the incipient stage of consumption, continuing it for only a half an hour at a time, or an hour at most, with results which were far from pleasing or satisfactory.

If an hour in every twenty-four or forty-eight hours of such an influence was attended with untoward results and had to be relinquished, what words could express the folly of placing patients where they would be constantly exposed to a similar effect for twenty-four hours a day?

Another check to exiling patients is, strange as it may seem at first thought, the exact opposite to the physical condition of the pulmonary organs which we have been describing—namely, a very large amount of *vital capacity*. My observations made upon healthy men have taught me that the advantage which accrued to the general vigor of men with a large vital capacity in this sadly abused land is most pleasing. I have never seen a thoroughly well-developed athlete who did not possess a vital capacity

above the average. I might mention names, but it has been observed that we are discussing principles. I have avoided the mention of particular locations, as the principles under discussion will aid the honest inquirer for truth in his selection of any climate whose benefits are conveyed to the patient through the rarefied air medium. It would be impossible to formulate a guide or guides for the correct application of every thousand feet of elevation above the sea level. There are some cases to whom, in virtue of a large expression of resistance, a lofty altitude effect may be applied with perfect safety.

There are others, who we have learned by application of scientific principles possess more vesicular structure than the density of the home atmosphere renders necessary to the complete physiological changes and processes involved in that vital adjustment of waste and repair to which the term "health" is more or less correctly applied.

Why should a large amount of vesicular structure serve as a check to the use of the remedy under consideration? We asserted or called your attention to the resemblance contained in the metaphor that a plant which has been reared and brought to a high degree of perfection under the influence of an almost ideal environment could not be more favorably affected by any change that might be meditated. We expressed the opinion, too, that 260 inches of respiratory surface affords to the constitution as much protection at home as it would abroad. In fact, I may truthfully state that we may expect more reactionary protection here than we should expect in some more relaxing countries.

Our first reason for the above caution is the following:— Consumption acquired under the condition of breaking over a barrier or through a barrier, which has done much to resist the advances or the victorious march of the almost universal conqueror, is a frightfully fatal disease. Life, which gives to phthisis the advantage over the greatest advantage (other things being equal) that the members of the human race may have, is singularly favorable to the progress of the disease. The presence of tuberculosis in an individual who has been endowed with such almost invulnerable armor, points to a mode of living which has been characterized by follies and foolish and extravagant expenditures of vitality in every form.

The prodigal son had not more truthfully wasted his substance in riotous living than has such a one wasted that precious legacy which to him was life. Wasted it? Yes, wasted it with the effect of discovering, perhaps, when it was too late, that he, too, not only has played the part of a foolish prodigal, but has sinned away his opportunity to return to the land of health—a land which he valued so lightly—whose privileges were treated so contemptuously. But, peradventure, there still remains to him enough of that fine form and beautiful, symmetrical development to give him the victory over his enemy. Is he not, then, a suitable subject for far-away treatment? Pray, why? Since his large respiratory development would permit him to breathe a highly rarefied atmosphere without adding to his capacity, such a change would offer us nothing to which to look forward. Hence the metaphor—the possession of the *highest* form of resistance makes the addition of any higher

form impossible, since we may compare superlative only with superlative.

Since he has treated slightingly the best protector obtainable either at home or abroad, he must look for the star of hope in another sky. Most happy may he deem himself if, by leading a life which is as highly characterized by wisdom as his former life was by folly and indiscretion, as an adjunct to the best medical counsel, the star of hope brightens into a realization of restored health and old-time vigor.

It is sad to see anyone wander from the path of health even for a short distance, even though he may return repentant and sorrowful with a God-given resolution to henceforth walk in wisdom's ways, "whose ways are ways of pleasantness and all of whose paths are peace."

It is sadder to see him wander so far away that had he gone only a few steps farther he could not have returned.

But, oh! it is saddest to see especially a man with the sparkling dew of his youth upon him wander so far away that he *may not* return. Longingly, indeed, regretfully, indeed, remorsefully, indeed, may he stretch out his hand to grasp those golden moments studded with diamond seconds. Alas! they have taken their flight. "The harvest is past, the summer is *ended*," and no golden sheaves has he to bring with him. Skeptic, infidel, or Christian, no man was ever known to throw away his glorious, youthful prime, who did not live to reap a harvest of barren regrets. It is not a moral that I would teach. The conclusion that I would draw for my readers is, that the depressing reaction of remorseful, retrospective views, of privileges trampled rudely

under foot, of opportunities slighted and neglected, renders the management of all such cases a matter of supreme difficulty. Correctly included in the list under discussion, we pause to speak further of the class of consumptives who, for some reason or other, entertain as a perpetual guest bitter disappointment.

In the words of the late Dr. McCosh: "The disappointment may sink deep into the heart, the habitual mood is that of emptiness, relieved only by a gnawing at the vitals, and going on toward bitterness and a demon-like hatred of women as women or of men as men." . . "When the grand climacteric period of life has been reached and the animal spirits have been drunk up by repeated disappointments," such psychologic reaction is pathologic in its results to a marked degree. "Of all people, I have found these to be the most difficult to gain; no summer will thaw the eternal snows upon these high and unapproachable mountain peaks." In the event of such persons possessing a hereditary tendency to phthisis, they become chosen victims and very readily, indeed, fall a prey to this disease. Of all people, I have found these the most difficult to reach, and the potency of our best remedies is exerted in vain. No sunshine of health ever comes to the eternal snows of disease upon these high and unapproachable mountain tops. There is something so wonderfully pathetic in a consideration of the physiologic and pathologic effect of the emotions upon the human organism that nothing but the important bearing which it has upon our subject induces us to discuss it. Yet the consideration of the important checks to the treatment proposed as the subject of this

treatise would be sadly deficient did we omit to give to them their full value, melancholy as it may be.

Temperament.—Many great men have been liable to fits of despondency, to moods of melancholy. Aristotle has remarked that men of genius are often of a melancholy temperament. We can understand this. "They do not find their high ideal realized in the world and they retire within themselves or retreat to some shade."

"Whose melancholy mien accords with their soul's sadness." In some cases of this description, the cloud comes down lower and lower upon the mountain, and at last wraps the whole soul in thickest mist or dismal gloom. We cannot afford to fail to take into account, in summing up our evidence, this important factor. To all patients who may be distinguished enough to be so affected, all promises made should be extremely conservative, all expectations of cure should be kept wisely in the background.

Temper.—Not less unfortunate in its effects upon a morbid process in the pulmonary organs (perhaps more especially) is the controlling influence which this factor has upon not a few persons. That lack of manly and womanly self-control which many parents have failed to inculcate in the minds of their children, and which has not, perhaps, been a part of their own education, is not without its painful consequences when viewed from the standpoint of its effect upon the vital processes. Indeed, what observant physician has not seen attacks of profound debility lasting for days, it may have been, before they were fully recovered from, which attacks were conditioned by a violent outbreak of passion which grew out of a *trifle*.

> "But ever after the small violence done
> Rankled in him and ruffled all his heart,
> As the sharp wind that ruffles, all day long,
> A little bitter pool about a stone
> On the bare coast."

A fatal amount of energy is not infrequently wasted "in the heat of small molecular motion" or in "spitting sparks." The reaction of a mind infantile, indeed, in the matter of self-poise is, under no circumstances, favorable to throwing off a morbid process which has attacked the individual's vitality. The depressing and force-consuming emotions, whenever and wherever found operative, may not be overlooked, since they so often turn the scale of destiny in favor of departure to the untried beyond.

It will, I think, be apropos to my theme to voice the beautiful and truthful sentiment contained in the following stanza:—

> "Yet why so harsh? Why with remorseless knife
> Home to the stem prune back each bough and bud?
> I thought the task of education was
> To strengthen, not to crush; to train and feed
> Each subject toward fulfilment of its nature,
> According to the mind of God revealed
> In laws congenial with every kind
> And character of man."

Emotions, when acted upon by the intelligence on the one hand and the conscience on the other hand, give in the language of another, "A high elevation to our nature; and as they have descended like the rains from the sky, so their breathings mount upward to heaven and to God." Not less rain-like or dew-like is the refreshing energy of their reaction upon the bodily resources when so trained

that their "breathings mount upward to heaven and to *God*."

It is with a feeling of infinite sadness that we contemplate an emotional reaction, which descends upon some lovely form as a destroying and blighting curse.

We borrow from our much-loved Emerson, with which to conclude this theme of our theme, the following:—

"'Tis impossible, but that thought disposes the limbs and the walk, and is masterly or secondary. No art can contravene it or conceal it. Give me a *thought*, and my hands and legs and voice and face will all go right. And we are awkward for want of thought. The inspiration is scanty and does not arrive at the extremities."

The force of the quotation is patent. It were well if the effect of the training many minds have received were too scanty to reach the nutritive processes, but it does reach them, and with the effects just portrayed.

SEDENTARY WORK.

The necessity of pursuing a sedentary occupation abroad will defeat the influence of the most salubrious climate. As previously stated, the giving up of an in-door life for an out-door life is the *medicatrix naturæ*, which may be often successfully applied in any climate. I would not attempt to uphold the theory that life in the open air is a sovereign balm for all the agencies that are enemies to life, but I do uphold the *theory* that it affords a protection against tuberculosis, and is curative when life in a large town or city and spent largely in-doors would have been followed with fatal results. The exchange of city life or town life in one climate for life under the same conditions

in another climate has little, indeed, to commend it to our favorable consideration. It has been urged that because consumption is almost as frequent among farmers as it is among city people, that the protective potency of country is more or less mythical. Let us view this proposition for a little more closely. *Syllogism, premise major*—a certain number of farmers breathing country air and spending much of their time out of doors, become victims of phthisis. *Premise minor*—the same proportion of city people breathing germ-proof city air and spending much of their time indoors also become victims of the same disease. *Conclusion*—therefore, city air is not more unwholesome nor unhealthful than country air. Methinks it would be rather difficult to palm so faultily constructed a syllogism off on the average schoolboy.

A larger percentage of farmers and farmers' wives become insane than people following trades, other callings, or professions. Does this prove that country air and country environment make people insane? Certainly not, assuredly not. While city life is often faulty to an extreme degree or to a degree which often wastes the vital forces, rapidly and surely inducing as a direct result fatal forms of tuberculosis, it is hard to conceive of modes of living more radically injurious, more certainly destructive in their tendencies, more directly and fatally devitalizing than the awful humdrum and wearisome repetition of the life of the average American farmer. The wonder is not that so many die of consumption, but that so many do not.

No more potential agent was ever used as a protection against disease or as a curative factor in its treatment than

the almost magical effect of new impressions, new faces, contact with nature and art, powerful to impress because beheld for the first time, or for the first time in months or years, as the broad expanse of the ocean's breast as an exchange for the most picturesque landscape to which the eye has become accustomed. Lofty rocks, deep ravines, and promontories as an exchange for old ocean, even when he is most fitful and changeable, spice-laden breezes and softer skies for the matter-of-fact atmosphere and the wintry canopy, restore to waning strength and departed zest in life and its realizations their sometime vigor. Should we wonder then, that the farmer's son or daughter, who has seen the lightning express for the first time at the age of twenty, or whose range of life and impressions have not extended beyond the confines of the nearest village with its awful insipidity, and who daily manifest an awful weariness, which is not removed, in many cases, by a sufficient number of hours of "nature's sweet restorer," I say, should we wonder that the possessor of such favors should, not infrequently, be found lying where the marble pointing to a land of rest acts the part of a noiseless sentinel? I have many times marveled at the resistance that pure air and living out of doors affords to people existing under such depressing influences. It is a poor compensation, it must be admitted, but compensation it seems to be.

Lay not so *grave* a charge to the counteracting influence of the sweet, pure, restful, non-city atmosphere. Repeatedly has the author seen car-loads of pale, air-hungry, New York children transformed—transformed is the word—in two or three weeks into objects so unlike the products

of the dirty, germ-laden, philanthropic air of the metropolis that, methinks, their parental antecedents might well look the second time before claiming them as their own. All this sudden evolution was the product of an atmosphere that has no more recuperative power than the sweet Pasteur-filtered air of our immense cities!

Should I, then, apologize for saying that if city patients are not to enjoy such a change, the experiment of sending them to the most healthy climate would in all probability be a failure?

To revert to the New York children previously mentioned, let me say that the tubercular milk so much condemned and talked about, was one of the atmosphere's most active helpers in the production of the aforesaid change. I confess that it has often struck me as being strange that the milk which makes muscle and rosy cheeks in country children is tabooed and condemned by the wise health-boards of some of our cities, not far distant from our own, as being laden with those interesting, microscopic forms of life commonly called "tubercle bacilli." I suppose, however, that it is an illustration of the principle that what is one man's meat is another man's poison.

Another check to sending patients abroad with which I shall engage the attention of my readers is the presence, in any case for which an elevated region may be considered beneficial, of a marked disparity or disproportion between his present condition and his former standard of health. Of two individuals, each possessing at the time when he comes under observation, as nearly as can be determined, the same extent of local involvement and the same number

of residuum units of vitality, the same age, the one between whose remaining vitality and former standard of vitality the largest disproportion exists would, other things being equal, be less amenable to treatment than the one in whom only a small disparity is present. Put in another form, what is comparative strength to the latter person is great debility to the former. A, whose condition is not a manifestation of a large amount of remaining vigor, is, nevertheless, showing a remarkable amount of resistance to the progress of the disease. B, whose condition is not characterized by more or less vigor (as far as we may measure vigor) than A's condition, is, nevertheless, an illustration of a small amount of resistance, and offers to our means of arresting his trouble little hope of success.

Let not this important comparison of the patient with himself be overlooked or lightly esteemed. How often we have seen patients in whom the disease has advanced to the third stage still retaining a power to combat their enemy which is not possessed by a stronger individual in the first stage.

Having considered the restraints to treatment through the medium of rarefied air somewhat in detail, since the great importance of the subject demanded it, we now take up a more pleasing part of the theme, namely, *class or group of cases offering a well-founded hope of cure* through the kindly intervention of climates, which, though foreign, prove to be more kindly in their effect than the native land or *fatherland*, as the warm-hearted German people term it.

I fear that some have been beginning to feel, too, that the exhaustive character of my analysis is sufficient to exclude

all cases from probability of benefit through climatic intervention. Such, however, is not the case. There still remains a certain proportion of cases more fortunate than those of whom we have been speaking.

We will mention, first, patients possessing an average or somewhat above the average amount of vital capacity and evidences that the system is tolerant to a large degree, as shown by the absence of marked exhaustion, the absence of much disturbance in the circulation and temperature range, good appetite, good digestion, and fairly active assimilation, permitting some loss in weight, it may be, but a loss which is taking place very gradually indeed. While it is true that such an index of resistance to the disease is most frequently found in the stage of incipient involvement, it is not at all a necessary condition for the successful application of high altitude treatment, since there are cases which seem to dispute with the disease every inch of the ground, even when cavitation has taken place. Indeed, everyone knows that the final arrest of the disease in the third stage is by no means uncommon. Quiescent cavities have been found at autopsies when their presence caused great surprise.

Such expression of tolerance in the ones just mentioned has been found to be present. Bad hereditary tendencies, such as the early death of a father or mother, or both, or the death of a large number of brothers and sisters, should not be allowed to militate against the choice of a high altitude, as determined by the amount of energy it would subtract from the general fund before its restorative influence would become apparent.

HEMORRHAGES.

The occurrence of frequent hemorrhages, some profuse, should not, either, deter the medical adviser from applying this treatment. It may be that the influence which elevations often exert in arresting the form of the disease characterized by numerous and violent hemorrhages, is exerted through the nervous system. Probably it is, but be that as it may, we know that in the case of not a few individuals repeated efforts to live in this climate have been invariably attended with a recurrence of the hemorrhage. Let me lay down right here the kindly caution that oft-repeated experiments of this kind are a risk which certainly does not commend itself to us as either safe or prudent. As a counterpart to what we have said with reference to out-door life, we note that those patients having some energy to spare in bringing themselves under the tonic influence of some higher elevation, and who are at liberty to make their mode of living entirely subservient to recovery, offer not only the brightest hope of cure, but require a less margin as a protective basis of operation. The man, for instance, who may go to one of those tonic, bracing regions which offers to its visitors a large number of thoroughly fine days, days suitable to sitting out, riding out, or walking out, who has with him thoughtful, careful companions and servants, and who may spend the time in harmless entertainment or with congenial fellow-sojourners, has much to gain and will probably have his health restored to him.

DISPOSITION.

Those fortunate individuals, who are possessed with happy, sunny dispositions, and with a thoroughly philosophical view of their surroundings, showing remarkable complacency on all occasions, not being worried and irritated by those fretting, rubbing trifles, which call forth a large daily expenditure which might have been avoided, do not require as large a margin, other things being equal, as a basis for the action of the kindly influence of some foreign haven.

MUSCLE TRAINING.

We will, I know, be pardoned for again referring to muscle training as a more hopeful foundation for treatment at home or abroad, but more especially abroad. It is remarkable, indeed, with what a small vital range and flabby condition of the respiratory muscles some Americans live. *Live*, yes, and imagine themselves to be enjoying life's best things when the root of the false conception lies in a faulty standard of health. In reading the last report of the American Association for the Advancement of Physical Education, I was most pleased with the nature of its contents, the points advanced being interesting and practical. I insert a quotation taken from a stenographer's report of a lecture by G. Stanley Hall, Ph.D., LL.D.—"Some Relations between Physical and Mental Training." The following is Dr. Hall's suggestive and forcible language: "Of course, physical exercise addresses itself to the great muscle-tissue, which makes up *half* the average

adult *male body* (I suppose by weight). Their culture is very important. The muscles have done all man's work in the world. They are especially the organs of will. You cannot have a firm will without firm muscles, and there is nothing so dangerous for morals as to have the gap between knowing what is right and proper and healthy and the doing of it yawn; and it always yawns if the muscles *get weak*. If they are flabby, it is a great deal harder to do things. I believe that the temptations that assail young people nowadays are to quite an extent those that would not overcome them if their muscles were strong. They are of the insidious, corroding, undermining kind that are, somehow or other, so prone to creep in as the contractile tissues become relaxed and habitually flabby; so that I should place as the second, muscle habit, because that is another criterion by which a nature is judged in the long run. Those nations persist, survive, that have good muscle habits, that exercise in a proper normal way." Now, as reliable and fundamental as this truth is (and I suppose it appeals more directly to those actually engaged in physical education), a more important truth is, I believe, taught by specifying certain groups of muscles, which have been fitted up by nature to perform that most important office of receiving air into the body and forcing it out of the body. In fact, the importance of *well-trained* and well-developed (as the two are inseparable) respiratory muscles, as having a wonderful prophylactic influence and as aids to recovery from disease, can scarcely be overestimated. I have not the slightest doubt, either, but that Dr. Hall would admit a truth which has been included under his generic statement.

I feel that while the whole map of muscular tissue should receive the kind of training designated by the learned Doctor, a higher significance, I believe, attaches itself to the group upon which the important function of maintaining the respiratory process has been laid. Methinks, too, that it is rather difficult for the *thoughtful scientist* to overlook the truth (so ably advocated by Prof. Mays, of this city) that a disordered nervous system and phthisis are very intimately associated. I expressed the opinion in a former part of this work, that all known resemblance between nervous exhaustion, pure and simple (neurasthenia), and tuberculosis was not sufficient to lead to the conclusion that they are fundamentally allied to each other. That is to say, the form of nervous disorder which may be connected with tuberculosis as cause and effect is something more than an exhausted condition of the motor or nutritive nerve supply. Fundamentally, consumption is always and ever a manifestation of morbid, trophic changes tending to loss of weight and emaciation. Nervous exhaustion may, I admit, lay the foundation for that form of nerve change which is so closely connected with all the morbid changes which take place in tuberculosis, but nervous exhaustion may and does exist without leading to such changes. The vital point which I wish to make is the fact that improved condition of the nervous supply sent out by the pneumogastric nerve, as complicated as is the supply, and the better "muscle habit," are important combating agencies to the progress of tuberculosis.

Therefore, to draw the scientific conclusion resident in the foregoing remarks, other things being equal, those

individuals who have well-trained chest muscles and a better condition of nerve supply resultant therefrom, may, in virtue of such a possession, be properly classed with the group of cases that may be successfully treated with *higher altitude* effect nicely adjusted to the amount of vesicular structure possessed by the patients, a certain amount of vesicular surface, of course, being taken as a warrant for changes of greater or less intensity of effect.

By a proper adjustment of altitude to the varying respiratory conditions, 1000 feet may give to A. the same tonic effect that *2000* feet will impart to B., and so on as we ascend the scale of effect upon an ascending ratio of surface for vital exchanges.

An illustrative comparison will convey the truth, which I wish to express more forcibly. Miss A., victim of incipient phthisis, family history bad, amount of local involvement small, area—subclavicular region of left apex, ancestry with a history of various forms of nervous disorders, epilepsy, hysteria, peevishness, and irritability of temper, etc., resistance or tolerance in stage mentioned encouraging in amount, spirometer gauge, inches of vital capacity 120 (low in proportion to the amount that proper training would have developed), range of motion small, respiratory muscles flabby and lacking in proper training of any kind beyond the amount of exercise involved in taking *quick, shallow inspirations*, innervation correspondingly defective, pneumogastric nerve probably undergoing some form of degeneration—trophic likely. Miss B. becomes a victim, under similar conditions of unfavorable family history, same amount of local involvement,

same area, etc., but the contents of her lungs, after a full inspiration, raises the stem of the spirometer to 160—*plus 40 cubic inches* in favor of Miss B., range of motion good, her respiratory muscles previous to the time of her illness have had careful, scientific training—Wellesley, Vassar, Bryn Mawr, Oberlin,—innervation in better condition. Miss B.'s 40 inches more of respiratory surface, well trained respiratory muscles, better innervation through the pneumogastric are the determining factors of resistance, which would render her amenable to the effect of a much greater elevation, while the absence of such features in Miss A. would be to her a determining quantum, which would make it not only not advisable to send her away from home, but would make the prognosis, under any conditions, however suitable they might be, exceedingly unfavorable.

Brethren, these differences are scientific, and you cannot afford to ignore them in your work of summing up units of resistance.

The statement iterated by G. Shell Robertson, M.D., Secretary of the Medical School University of Melbourne, Australia, in the *International Medical Magazine*, February, 1896, and its truthfulness if made with reference to other famous consumptive resorts, speaks to us of the desirability and almost moral necessity of discrimination. His statement is the following:—

"Phthisis" . . .; "in an average year about nine per cent. of the total deaths are from phthisis, but in all the Australian colonies the deaths from phthisis are materially increased by the death of persons who have come to

Australia either already suffering from it or predisposed to it." No more pathetic truth may be uttered. I say, in all honesty, that a nicer discernment in the selection of cases would rob such statements of much of their truthfulness or render their utterance unnecessary. Let me call your attention as briefly as possible to the closing phrase in the sentence quoted: "predisposed to it." You will notice that a large number of deaths annually take place in such *charmed spots* because the climate has not only not counteracted even a predisposition to phthisis, but has been an aggressive agency, developing the predisposition into the actual disease, and the disease into death.

TUBERCULAR LARYNGITIS.

Tubercular laryngitis adds one more important factor to the seriousness of the malady, and should be looked upon, in a very large proportion of cases, as a determining factor in favor of remaining at home. Only under the most favoring conditions should its presence be allowed to weigh in the balance in favor of another climate. Whether an early complication or a later complication, it is always a most serious one. As a rule, I think that I am correct in asking you to look upon it as one of those important indices of that lack of tolerance to which I have attached so much importance in a previous part of my discussion.

Almost all of those complications express themselves as tubercular or "cold" abscess, caries of the spine, hip-joint disease, or tubercular arthritis. These should be, in certainly the largest proportion of cases, determining factors in favor of home treatment and home regimen.

Especially are these remarks important with reference to an early tendency on the part of the disease to attack or involve the digestive tract. The inability to call into activity a thorough relish for food or the failure to produce the power to digest a quantity of easily digested food, which was readily disposed of prior to the inception of the disease, I have learned to regard as pointing to a deeply seated constitutional change, which will defeat the most carefully studied and best known plan of managing the disease.

A marked tendency to diarrhea or an irritable condition of the bowels is, in addition to the exhausting effect which it, itself, produces, not infrequently associated with a profoundly disturbed nervous condition, manifesting itself in outbreaks of temper, despondency, peevishness, or most alarming attacks of palpitation, causing some patients to sit in a stooping position for hours holding the hand over the heart, afraid to move lest a fresh attack of palpitation should supervene. I have known patients who believed, and without a correct foundation, that certain drugs were responsible for their attacks of nervousness. No amount of persuasion that I could exert has ever induced them to continue the use of a drug which their imagination has clothed with effects which do not belong to it. I have often, however, continued its use by changing the form of administration. All such attacks of palpitation not associated with organic, valvular trouble, are because of their depressing effect, serious drawbacks to the successful application of any plan of treatment.

Anemia.—It is, I believe, the generally accepted belief

that anemia, either simple or pernicious, does not tend directly to the production of *phthisis*, while on the other hand, with a decided tendency to impair the hemogenic function, it is one of the most serious forms in which it impresses itself.

I have been led to regard the anemic complication of consumption as a feature which throws a gloom or cloud over a promise which might, otherwise, have been quite visible. Tuberculosis of the blood corpuscles would seem, in some cases, to be the nature of the morbid change which affects them. Those advocating the neurotic theory of phthisis tell us that the change lies deeply in the subtle process of blood genesis, which is more or less directly under the domination of the trophic nerve supply. Be that as it may, we shall not stop to discuss the probable cause. We wish only to remark upon its presence as being an ill omen and, as has been previously remarked, should clothe our prognosis in very somber garments. The preparations of iron, too, are of little value in effecting the restoration of the blood-making function to its wonted functional vigor.

Age.—The extremes of age, owing to the inability to evolve that amount of energy, to which we must ever and always look as the repository of our resources for combating the advances of the destroyer, are exceedingly unfavorable to the successful application of climatic influences. I do not mean, either, by the word extreme the very tender infant or the octogenarian a decade ago, and who may yet bear upon his shoulders the weight of a century of years before he makes his final exit to the beyond. Very

young children are lacking in that development which gives to new interests, new scenes, and new environment their magic potency. They are less responsive to the influences which act through the medium of the nervous economy. I would not, however, include in this statement or as belonging to this category, for example, those air-hungry, almost starved, emaciated victims of the tenements of the great cities of our own philanthropic land. Unconscious, at first, of their environment, emaciated and with a cadaveric appearance, a loftier, purer, and, to them, health-laden atmosphere is the "angel of the passover," which causes disease to pass them by, even when it appears most probable that he has selected them as objects of his remorseless sway.

The affections of the man, who was ten years ago threescore years of age, have usually taken so strong a hold upon his native environment that it is not generally wise to attempt to sever them. The fire burns low upon the hearthstone, nervous responses are slow and lacking in that intensity which makes them most useful as tonics. It is true that judgment sits with majestic mien upon her throne. The fiery impetuousness of youth and the ardor of mature manhood now yield willing obedience to her scepter. The chest, however, will have become bony and fixed and its suppleness and elasticity will have departed. Add to this the fact that a progressive process of involution must soon, at best, terminate in its final consummation. The fond attachment to old scenes, the absence of that interest in life and its products, which often translates itself into a weapon to cast out, as it were, by violence, the

intruder, so that we may well dismiss any thought of changed environment.

It occurs to me, at this point, that I have said nothing as yet about the danger of hemorrhage in certain cases as the effect of a removal to a great height above the sea level.

Briefly, the danger applies to cases where a destructive process is thoroughly active or has been previously, and to cavities which are not altogether latent or quiescent, but still show some degree of activity as indicated by a few large, moist, silvery, or amphoric rales.

With reference to all such cases, let me say that any intention of sending them to a higher level while such activity is present, I do not regard as prudent. They should better be sent to a lower level or be kept religiously quiet at home. By this I do not mean the exclusion of passive exercise, I mean only that it would be wiser, during the stage of such expression of activity, to use either passive exercise, or very little active exercise. A rest treatment that is more wearisome and fatiguing than a *well-adjusted* amount of *suitable* exercise is not rest treatment, but *un*-rest treatment.

Cardiac Complications—mitral regurgitation. This form of organic lesion is usually looked upon as being more or less of a protection against the pulmonary forms of tuberculosis. The theory that such is its tendency is based upon clinical observations, which observations are more valuable touch-stones than superficial and most carefully spun theories. Upon the same principles, these lesions give a more favorable aspect to the prognosis. I

shall not, of course, be understood as referring to the advanced stage of mitral regurgitation, but to those degrees of advancement upon which a fair degree of compensation has been established. I look upon mitral stenosis, if at all advanced, as being a much more serious complication, since it tends more directly to dilate the right ventricle, throws an additional amount of work on the right auricle, produces a tendency to gastro-intestinal catarrh, general muscular relaxation, a badly nourished nervous system, visceral torpidity, etc.

Aortic Insufficiency and Stenosis as Complications of Phthisis.—It is scarcely necessary to say, especially to practical heart-men, that any and all disadvantage that these lesions, simple or combined, may be to the patient depends almost entirely upon the extent to which they may have compromised the circulation.

We know that they are serious enough when existing alone to produce such serious and universal disturbance that in the advanced stages they must necessarily exert a most deleterious influence upon a disease which is as inherent as is tuberculosis.

We shall consider these two lesions separately, directing our remarks first to aortic incompetency, which is certainly the most serious complication of the lesions involving the aortic valve. We shall note its effect first upon an incipient involvement, when compensation has been fairly well established. In viewing compensation as a kindly effort on the part of nature, as a result of her effort to repair a broken breach, we must take into consideration the following physiologic truth: The heart possesses, as a

primary and inherent endowment, a certain quantum of reserve force, which may be correctly looked upon as undeveloped potentiality. Greater or smaller amounts of said force are always used in the work of rendering to the impaired circulation the necessary amount of compensation to perform its functions in a creditable manner.

The amount of reserve force or potentiality which has been called into use, depends upon the extent of the injury done to the central organ of circulation and upon the time of life when reserve force has been called upon to do a service for which it was not originally intended. It finds its physiologic intent in enabling the organism to do, upon certain occasions and for a short time, an amount of work which could not, in many cases, be done successfully for a number of hours. It is very plain, indeed, that the amount of force which nature has used in her work of repairing an injury to her broken values is a dead loss to the emergency fund, so that, other things being equal, any amount of force thus subtracted or used is registered in the lessened ability to endure the severe amount of fatigue borne by those who have not made such an expenditure. The emergency fund is always lacking in various degrees, from the ability to take exercise or perform work which does not require too large an amount of strain to the inability to do anything which makes its use necessary. Nature being called upon to use it as a reparative force and to use all of it, its loss is painfully felt when any work requiring exertion is attempted; so that rapid walking on the level, or the effort used in ascending an inclined plane or inclined planes of various angles, is immediately

registered in the form of a painful and oppressive dyspnea, and the heart's work is performed by a partial use of the non-emergency fund and by the expenditure of force exhibited by its rapid and violent action,—violent if there still remains seated in the muscles and ganglia a sufficient *residue* of power to produce violent action (rapid, *weak action* under such circumstances indicating that the heart's vitality has been largely expended in its efforts to be loyal to its cause). Add to this the feature of intermittency called out by such exertion, and we know that all such efforts are performed with a great risk, and if persisted in will be an illustrative example of *asystole* or *instantaneous death.*

The emergency fund may seem, in some cases, not to be lacking in health, but it is remarkable how quickly any debilitating affection will indicate its *partial* or total absence. It would appear from this that it finds its most fitting application as a factor in preventing the depressing action which all debilitating diseases have upon the circulation. In countless instances the balances have been turned in favor of death because the malady from which the patient was suffering took advantage of this absence to steal away his life. A knowledge, then, upon our part, that said patient suffered, at some time previous to an illness for which he is being treated by us, from a rupture of compensation, or in the integrity of his circulation, should direct our attention to his heart as being lacking in the supporting influence of that power—or of some of that power—which was laid up in it as a safeguard against disease. A knowledge, too, that no work but the kind of work requiring a small expenditure of cardiac energy could

be, previous to his illness, performed without marked dyspnea, should make us religiously cautious and cause us to direct our best energies to supporting it during the trying ordeal through which it is being called upon to pass.

The application of the principle to the disease under discussion is not difficult. Lack of the reserve cardiac fund, which nature uses to repair the valvular injury to the circulation, cannot be without its effect, more or less pronounced in proportion to the draft made upon it, when phthisis has taken up its habitation in the pulmonary organs. As stated previously, a disease which has so much intrinsic power to destroy life as has aortic insufficiency, cannot be associated with another disease possessing equal power without complicating it to a degree which is governed by the extent of the aortic lesion on the one hand, and the pulmonary involvement on the other hand. Few diseases have more power to impair the general constitutional vigor than an advanced stage of aortic incompetency. This serious involvement follows a descending scale of effect, said effect taking a lower and lower place in the scale as the lesion is less and less grave in its consequences.

I have certainly made it, perhaps, too apparent that the scale of choice must certainly often be turned by the presence of this malady in favor of retaining the patient at home. A correct estimate of the devitalizing effect it frequently produces, the liability to sudden death which it carries with it, etc., certainly makes it necessary to retain all who may be suffering from this cause religiously at home. It will not be too foreign to my subject, I hope, to

state here that in the event of any such patients arriving at the stage when nearly all parts seem, under other conditions, to be about equally worn out or in a state of similar debility, they will probably die of sudden heart failure when they would have lived, in some cases, months longer had the disease not been present.

I do not regard aortic stenosis, unless it is present in a marked degree, as so serious a complication as aortic insufficiency. Heart failure is certainly much more liable to take place early as a result of the latter than of the former. The danger to the heart bears a direct relation to the amount of dilation which has taken place before an attempt at compensation is made. Hypertrophy, to be compensative in proportion to the amount of circulatory injury done, must always be proportionate to the amount of dilation which preceded it. There is always a point, too, at which compensatory hypertrophy may not be engrafted upon the *excessive* degree of dilation which was present. The danger from failure is, in such instances, very great. Now, it is well known that aortic stenosis not associated with much regurgitation is not accompanied by so large an amount of dilation, and the limit to which the ventricle may dilate is not so soon reached, and failure is not, therefore, so soon an outgrowth of the immediate effect of this lesion upon the ventricular walls. All will freely admit, however, that that degree of stenosis which is marked by small, feeble carotid impulses and correspondingly weak radials, faintness and attacks of dizziness, impaired memory, faulty cerebration, profound anemia, muscular debility, and trophic inactivity in almost every form, is a

serious complication whose sum total of unfavorable reaction upon the amount of resistance required to contend successfully with tuberculosis, makes a resort to any away-from-home climate a matter that would only eventuate in a more speedy arrival of the closing scenes of life's drama or tragedy. Add to the anemia which accompanies the advanced form of aortic stenosis the tubercular effect upon the function hemogenesis or upon the already damaged corpuscles, and the thought of benefit for more than a short period of time should be hastily excluded from the physician's thoughts.

Perhaps a still more serious complication is a combination of stenosis and insufficiency. I do not mean that this combination is always a serious complication. One form may, however, and does add greatly to the seriousness of the other form. We feel that the general principle here enunciated may be applied to a certain number of cases with a most important conservative effect. It was only recently that I demonstrated to the members of the chest class of the "Philadelphia Polyclinic" a case of general tuberculosis where dyspnea was, in virtue of the presence of an aortic lesion, rendered much more distressing. His pulse exhibited an irregularity in rhythm and volume, which was largely due to his serious complication, and his life will be materially shortened by its presence.

The increased amount of dyspnea which an organic valvular lesion would necessarily add to phthisical manifestations is liable to lead the investigator astray in the direction of causing him to look upon the amount of local deposit as being much more extensive than it actually is.

In fact, an organic valvular lesion is very apt, indeed, to lead the unwary astray in any stage of the process, causing him to look upon the disturbance in the respiratory function as having its cause in a deep-seated and extensive pulmonic involvement.

Those brethren especially who do not possess the power to make that *nice use* of physical diagnosis which has added such important results to diagnoses and prognoses, and who are governed almost entirely by the constitutional expression of the disease, are very frequently, indeed, led to attribute a greater or less amount of the existing respiratory difficulty to an improper source. Since so much value attaches itself to the amount of dyspnea which accompanies the first invasion of phthisis, no more important matter than the ability to eliminate all non-pulmonary sources of dyspnea may present itself. It is foreign to the scope of this work to enter into a full etiologic discussion of the character of that form of dyspnea which grows directly out of a tubercular involvement. I would like, however, to emphasize in every way possible that the ability to give to the cardiac element its full and true significance will give to the individual possessing it an advantage in his selection of cases to be treated in a higher region or in their native environment, which will fit him for saving many precious lives. My friend, Prof. Mays, would doubtless tell you that the important part which the pneumogastric nerve performs as a factor in tubercular dyspnea, should lead to the most painstaking effort to determine the amount of degeneration the vagus or its center has probably undergone. Dyspnea, when

correctly considered to be pulmonic, and translatable into pneumogastric degeneracy, pneumogastric degeneracy translatable into a basis for estimating the seriousness of the involvement and the lack of tolerance which it always gives to any case, indicates a most grave aspect. To sum up or gather the points included under this subdivision of our subject,—we note, other things being equal, that those patients from whose vital cardiac resources nature has withdrawn a number of units, ordinarily used by her as a sinking fund in disease, to repair a broken valve or the effect of a broken valve, labor under a disadvantage in their efforts to throw off the disease, the disadvantage having a direct ascending ratio to the number of units of the emergency fund which had been previously used. The amount of dyspnea which is present in a given case should be estimated as to its seriousness by excluding a cardiac source or by giving to it all the significance which rightfully belongs to it. The presence of a cardiac element in the dyspnea may be used as a determining number of units of tolerance either for sending the patient away or keeping him at home. The elimination of the cardiac element in the respiratory disturbance may, in not a few instances, so modify our estimate of the patient's condition as to relegate him to a class of cases for whom a very different plan of treatment would be feasible, and not only feasible, but successful.

An illustration, and I have done with this subject. The amount of energy which Mr. A. uses in the operation of his respiratory apparatus is represented, we will say, diagrammatically by an expenditure of 20 units of nerve force.

The amount of energy expended by B. in the work of respiration is also represented by 20 units. A. and B. are both victims of incipient phthisis. The 20 units represent in each case the use of a much larger amount of force than is often used in apparently the same stage of advancement.

A careful examination indicates that ten units of the force which B. is expending is the result of a small lack of compensation on the part of the cardiac muscles. This discovery would lead to an entirely different estimate of the gravity of B.'s trouble. By such an elimination, we arrive at the conclusion that B.'s pulmonary dyspnea is not out of proportion to the amount of local involvement which is present, in fact, it is rather less than we might fear to find it. The dyspnea, growing out of a lack of completeness in the compensation, which, by the way, may be established later, is by no means, under such circumstances, so serious a matter as a dyspnea of the same extent which grew altogether out of the pulmonary involvement. A dyspnea being illustrative of the purely pulmonary origin of the trouble would relegate him for successful treatment to another class of patients. A determination on the other hand that B.'s respiratory trouble was due almost entirely to the cardiac disease would render another plan of treatment necessary and, it may be, successful. We feel, however, that the important principle therein contained has been elucidated with sufficient clearness to impress our readers with its importance as a determining factor in computing units of resistance.

Location of Morbid Process.—The once almost universally

believed theory that the air entered the apices of the lungs with more difficulty or with less freedom than it entered other portions is becoming rapidly obsolete, but not so rapidly, we fear, as it should. It is surprising how many physicians still retain and grapple to their souls this venerable theory. Observations made by eminent pathologists and some recent investigations and spirometer tests made by the author have demonstrated the non-truthfulness of a theory which has clung to life with wonderful tenacity.

It will not do to say that the bacilli seek the apices because diminished apex expansion and a correspondingly low performance of the nutritive function as a result renders such area a suitable habitat for these semi-expressions of plant life. If this be true why do they ever seek any other portions? Perhaps it is well, however, that the present treatise is not concerned in giving reasons for certain processes, that is, only when the principle expressed finds its applicability in a knowledge of the real nature of the process, conditioning certain effects. Should the point under consideration as regards locomotion, other things being equal, have in any way a modifying effect upon the treatment, or any bearing upon the prognosis? Properly qualified, yes. The why in the above question or query may be more satisfactorily answered by a reference to what is properly styled the inherent tendency of phthisical products or, more properly speaking, the catarrhal products of phthisis. It is strange indeed that some eminent authorities contend that because the microscopic factors in catarrhal pneumonia and the same factors in catarrhal phthisis are essentially the same or are marked, more cor-

rectly speaking, by a predominance of similar epithelial elements, the diseases are identical. We are reminded at this point of a thought in Longfellow's "Hyperion," the reverse of which will forcibly illustrate my position,—not my position, but the scientific position bearing upon similarity of products:—

"Life is one and universal, its forms many and individual."
—("Hyperion," "Glimpses into Cloudland.")

Inflammatory products of the tissues which have power to set up and perpetuate an inflammatory process are "many" and in many cases "individual," but their products must necessarily be more or less "one and universal." No irritant can call out of a structure elements that are not contained in it. This all will admit, the elements comprising the structure bearing a close relation to the "one and universal" in "Glimpses into Cloudland." The inflammatory products have the same resemblance.

The microscopic features of a product which has been poured out into the alveoli must of necessity, in virtue of a biologic law, consist either of those elements which the blood throws out in its passage through the inflammatory area or which is poured out by the blood because of changes which have taken place in the arterial walls, or in the elements of which the alveolar structure is composed. There is one feature which seems to bear a constant relation to all inflammatory processes, simple, tubercular, specific, or malignant. The element to which I refer is intensity, the first degree of intensity giving rise to a croupous, fibrinous product, which consists largely of elements

which form a physiologic part of the chemistry of the blood. Ascribe the intensity of the product to whatever cause you choose—nervous, vascular, bacilliform—the fact is that the intensity as a necessary condition remains unchanged. It is impossible to divorce from each other a high grade of intensity and a croupous product. The second degree of intensity, or the subacute variety of inflammation furnishes us, when acting upon the pulmonary alveoli, with products which are in their nature largely epithelial or catarrhal, that is to say, this isolated element is the salient factor in the process. The third degree of intensity (following a descending scale) is what is termed the chronic form of inflammation, chronicity having as much reference to the variety of the inflammatory products as it has to length of time.

The very low degree of intensity which is a correct manifestation of what is more correctly termed chronic inflammation, as distinguished more especially from the subacute form, gives to the microscopic features of the case a predominating element which is highly different from the ruling element in the first varieties mentioned, the predominating element of the contents being determined by the grade of the process. The vital point which I wish to make, and to which the foregoing remarks have been an introduction, is that while the contents of the air cells and the changes in the surrounding structures are determined by what we call intensity or by the absence of intensity, or by modified intensity, the tendency or direction in which they tend must receive its impress from a more subtle source. At least as far as we may determine, it is the

specific character of the malady, modified, of course, by some contingent element, which determines the behavior of any and all such morbid elements.

Syphilitic inflammation of the soft palate, for instance, is an acute process, but it is more,—it derives its destructive tendency from the fact that it is both acute and syphilitic. Catarrhal phthisis is, as a rule, a subacute form of inflammation, but it is more,—it is both subacute and tubercular, which is equivalent to saying that it will tend in a different direction from the direction in which a simple, catarrhal pneumonia will tend. We must maintain that more knowledge is often gained by noting carefully the tendencies which engraft themselves upon products than by noting the products themselves. A tree is known not only "by its fruits," but by the kind of fruit which it bears, so alveolar products are not only determined by their elements but by degrees of vitality which said elements have had impressed upon them by a particular disease. To say that tuberculosis is catarrhal pneumonia is equivalent to saying that Willie is Johnnie or that Johnnie is Willie. Catarrhal pneumonia is catarrhal pneumonia, tuberculosis is tubercular pneumonia. Mr. A.'s distinctive identity consists just as largely in his propensity or inclination to do certain things, as Mr. B.'s identity consists in the absence of a propensity or desire to perform similar acts. A. and B. are wonderfully alike in their anatomic arrangement, their tendencies in certain directions are, however, just as radically different as their structures are radically alike.

While the inflammatory products of a genuine catarrhal pneumonia and the inflammatory elements of a tubercular

pneumonia are wonderfully alike, the personality, so to speak, which attaches itself to each one is essentially different.

Men may dispute as they will about the direct cause of phthisis,—let it be bacilliform, neurotic, or simple pneumonic,—all must admit that the distinguishing feature of said morbid elements is a tendency to caseous degeneration. Will it be contended that there is no difference in a local manifestation of a general vice whose invariable and ultimate tendency is toward caseation or caseous degeneration? If, as Professor Mays contends, the pneumogastric nerve is so largely at fault in phthisis, and I am not prepared to dispute the ground, having seen much to convince me that he is in all probability right, why not look for a specific tendency or direction in products, which are claimed to be, perhaps, more largely influenced in their characteristic direction by the nerve supply than other products? In whatever way this specific change (tubercular change) derives its peculiar tendency, of one thing we are sure, the tendency is present. Caseous degeneration is almost as constantly found in the second and third stages of phthisis as mucous patches are present in the second stage of syphilis.

But what has all this to do with distinctive location? Much indeed. It has been plainly shown by such authorities as Hamilton, Green, and others that an area of involvement which gives to the tubercular products a certain direction is much more favorable to recovery. To this testimony I beg to add my own. Those areas which permit the phthisical elements situated in the air vesicles to pur-

sue a *typical* course (by typical, I mean, of course, their tendency to undergo caseation) are less favorable to recovery.

While it is true that we not infrequently find a small local involvement situated at the apex or the apices clearing up, an involvement to the same extent would clear up much more readily and completely if situated at the base or lower in the superior lobe. We have all seen an extensive basic infiltration clear up beautifully when one as extensive if situated at the apex would have gone on to cheesy degeneration and excavation.

I think that it is no longer a matter of dispute that we may look for a reparative tendency on the part of the natural forces to dispose of a much larger amount of basic infiltration than apex infiltration. Clinical facts must be accepted, no matter if they do overthrow somebody's pet theory.

I state, too, on the authority of the best pathologists, that deposits in the lower lobes are more easily disposed of because of the modifying effect of their location upon the typical tubercular tendency of all her products. The presence of a mitral stenosis, mitral regurgitation or, it may be, an aortic stenosis must in many instances receive the credit of converting an inflammatory mass into a material which may be disposed of by the surrounding structures. Nature can, and does, dispose of a form of degenerated epithelial elements, etc., by a process of fatty metamorphosis. No careful investigator may deny the position that there is in the most healthy individuals, as far as we may apply the rule of health to their condition, a tendency on the

part of the circulation to throw out a certain amount of moisture. This tendency, I believe, I have fully established in my article, entitled, "Redundancy of Respiratory Surface," which appeared in the February number of the *International Medical Magazine.*

I hope, however, that this position will be accepted as correct without a presentation of the philosophic basis upon which it rests.

This additional moisture so frequently found at the bases determines, in a certain proportion of cases at least, the kind of degeneracy which shall control said morbid factors or epithelial products. The impress of *fatty change* or of caseous change is determined by the predominance of moisture, on one hand, without a particularly strong constitutional bias, and the presence, on the other hand, of a strong and deeply implanted bias,—a predominating bias we may say,—and the absence of the conservative power of moisture.

It is highly probable, too, that a basic deposit, with a sufficient amount of moisture to give to it a favorable direction, may be completely overcome by the inherent force or the constitutional bias or strong degenerative tendency which the trophic nerve supply of the pulmonary areas is manifesting.

By giving to all the contingencies in the case their true position as modifying factors (either favorable or unfavorable) we may truthfully lay down the rule that, other things being equal, we may more confidently hope for an amount of deposit at the base to be disposed of when the same amount located at the apex would offer to us no

hope of resolution. I do not say that infiltration at the apex may not be brought to a standstill or rendered latent in its operation, but I may assert that if it does pursue so desirable a course,—or, I might better say, manifest so desirable a tendency,—it will probably be after a certain portion of the morbid contents of the air vesicles has been removed by a process of degeneration, being either removed or rendered harmless by a process of calcification. Results in the latter case would indicate, too, that while a process of considerable extent may be arrested when located in the most favorable area for its morbid extension, its arrest is a matter of much greater difficulty, and is accomplished only after the system has been made altogether subservient to recovery,—resisting, winning the day after they had disputed it with the enemy for a long time, and inch by inch. As a conclusion to this topic, we may state, then, that an apex involvement that would make it wise and advisable to retain a patient at home, should often turn the scale of judgment in favor of sending him to a more tonic atmosphere if located at the base. We must keep ever in view the contingencies spoken of a short time before—as the presence of a strong tubercular bias may exert its controlling power, and leave its fatal impress upon the contents of any area. Everyone knows, too, that when a patient with a basic deposit has lost his vantage ground, it is usually after the process has attacked one or both apices. I feel that I am leaving the impression that it is in many instances a very complicated matter to take a correct inventory of our patient's resources. This is the impression that I wish to leave. It is the complexity of certain mor-

bid factors that should lead us to use, as a foundation for our conclusions, all the available indices in the case, lest our judgment be lacking in the wisest results.

Bacilli.—The present position of the medical profession with reference to the "tubercle bacilli," and the enthusiastic zeal *once* manifested by microscopists, make it advisable to devote a few remarks to the significance of the microbes or the significance of their presence in larger or smaller numbers. Tuberculosis, so called, seems to sustain the following relation to the tubercle bacillus as an etiologic factor.

The bacillus sustains, as far as the power of the microscope is to be relied upon, to the disease the following relations. The first (as determined by our best instruments and the users thereof) is that intimate etiologic connection expressed by the entire absence of the exciting cause or bacillus tuberculosis; only, in such cases, the name adopted as a fitting title for the disease reflects a credit upon the little organism, which evidently does not belong to it.

The injurious effect of the bacillus upon this group of cases need not be made a subject for remarks for either retaining at home or sending away from home.

The second group of cases to which I invite your attention is the group characterized by the presence of the etiologic factors in large numbers, "cavities full of them," and the entire absence of the disease, as accidental opportunities to perform autopsies have, not infrequently, demonstrated. Upon this group, I shall forbear to make any comments; evidently, it speaks for itself. The two next

groups to which I crave your attention for a little while *seem* to bear a somewhat more *rational* relation to the disease. It seems to me, however, that the seeming is the most rational construction to put upon them when they are viewed as conditioning the disease.

However, the groups of cases spoken of are distinguished on one hand by the early presence of the bacillus in larger or smaller numbers, and on the other hand by their much later appearance in either large or small numbers. The point in these groups with which I want to impress you is that the organism when present in the largest numbers bears no *discernible relation* to either the stage of the process or to the intensity of the inflammatory action. In the light, or in the obscurity, of our inability to trace any connection between the numbers of bacilli and the seriousness of the malady, the microscope, as a kodak to photograph the class of cases adapted to either foreign lands or home environment, may well be set aside as being worthless. It is probable that the "Röntgen rays" may be of service to us in the not far distant future.

Alcoholism.—It has been taught by some of our highest authorities that alcohol is opposed to the development of phthisis. To this we may not give our endorsement. We certainly have seen no evidence that the use of alcoholism in any of its stages renders this disease more amenable to treatment. Alcoholism has, of course, so wide a relative significance that its unqualified use is almost valueless. Certainly, no one may overlook the important fact that the death rates all over our country are annually swelled to much larger proportions by acute

and chronic alcoholism. Certainly, a drug which so often produces destructive changes in the vital organs and tissues in general of those who use it habitually and, not infrequently, in large quantities, may not be looked upon as antagonistic to a process or processes, the destructive character of whose changes is not at all unlike its formidable rival. We must, surely, make a distinction between the habitual use of the beverage and that morbid complexus of changes to which the name alcoholism has been given. The great frequency with which the habitual use of the drug for a long time is accompanied by morbid changes, which show a selective affinity for certain areas, and not seldom, too, for the most important organs and the most highly specialized structures or elements, would render it almost invariably safe to conclude that morbid changes have under such a use of the drug taken place to greater or less degrees. May it be said, for instance, that fatty degeneration of the heart, which is so very often the result of the use of spirituous *drinks*, is either an opposing factor to the introduction of the disease into the system, or that so serious a condition of the great central organ of the circulation is unfavorable to its progress? It does seem to me impossible that a negative answer could be truthfully given to such cases.

The author wishes to place upon record the fact that he has always found those individuals who have been accustomed to using even moderate amounts or, in a great many cases, of a vile quality of beer or whiskey, offer small hope of ultimate recovery.

Science and experience concur in their testimony that

any and all of those forms of alcoholic degeneracy, which creep into the structure so insidiously (often existing without the knowledge of the victim) have nothing to commend them to our favor in our work of opposing all of our therapeutic resources to the onward progress of that enemy to life whose march has so often been crowned with success.

The more highly organized the structure, the more highly fitted the cell units are for the performance of those specialized functions, which require a treatment in the infinitely high order of the medium through which they perform their work, the more susceptible they are to the destructive agency of alcohol. Those media through which the thoughts distinguished by the possession of the highest stamp of genius have passed to the outer world, have not been products of that alcoholic degeneracy which is so prevalent. Neither is the highest form of resistance, which the careful scientist may oppose to a disease which is to be dreaded in all its forms, a result of those hidden processes of degeneracy which follow in the wake of an influence which so often strikes at the very foundation of vitality or at the energy resultant from vitality's highest forms of expression.

Instead of regarding tissues from which a large amount of alcohol might be distilled, as contributing to our reserve forces, let us look upon them as being factors which may turn the tide of liability against their possessor.

Two diseases, each of which is characterized fundamentally by its distinctive antipathy to the processes of nutrition, can scarcely be regarded as having much antagonism to one another.

Two special features in connection with that multiplicity of changes which alcohol produces deserve special notice. They are the selective or elective affinity which it has for the cardiac muscles and the disastrous results which accrue to the nervous system.

The evil done seems to follow an ascending ratio of effect, which effect is conditioned by the fitness and special fitness of the nerve tissues to perform those physiologic functions which exhibit the highest forms of evolution and the greatest structural refinement.

First, then, its elective affinity for the cardiac muscles: I should better say at this point, that I do not offer these remarks as a disclosure of anything which is not already and almost universally known.

I offer them because this complication of tuberculosis is frequently passed by in the work of summing up the problem of vital resistance.

However, knowledge possessed and not applied, or non-applied knowledge may produce a feeling of semi-satisfaction on the part of him who possesses it, but it certainly may not be said to be of any advantage to the one whose condition is under consideration. I call upon you to apply in your work what the microscope makes known in its range of work.

That morbid obliquity to the vital economy which consumption induces, everyone knows, expresses itself in connection with many other morbid manifestations in an early disturbance of the circulatory system, said disturbance becoming more and more prominent as the disease reaches more serious stages of development.

In the event of the heart's not being organically affected at any time previous to the inception of the morbid process, I have not seen it exemplified that it fails any sooner in the race than the respiratory center, the general muscular system, the nervous system, or the visceral functions.

Every part of the exquisitely constructed fabric seems to burn out slowly but surely together. Every cell, it seems, has had its molecular activity reduced by a system of involution below the functionating point.

Just how far it may be demonstrated in the future that the pneumogastric nerve has reached a condition of more advanced decay than other parts of the body, I do not know. With the exception of that part of the pulmonary organs, or the portions of the body which have been the immediate seat of the pathologic change, amounting, as in the presence of cavitation, to total destruction of certain areas, all activity, in whatever form it has expressed itself, has been reduced below the vital standard.

The power of the microscope has its limitations and the nervous system may undergo subtle changes which future years may bring to light. It would seem, however, that the grand, overwhelming aggregate is the result of the presence of an all-powerful, all-pervading enemy to the life of every portion of the varied and various parts, not to the nervous system and thence to other portions, or all portions of the system dependent thereon, but to every cell and cellule. While it is true that the nerve structures and centers suffer more early in some cases than they suffer in other cases, the nervous systems do not seem to bear to the universal degeneracy the relation of cause and effect.

Any local absence of uniformity of effect (solution of continuity) exhibits a lack of that degree of evolutionary perfection or potentiality, in virtue of which the tissues are advanced from lower to higher forms, as we have unmistakable evidence that all parts of the organism have not followed a regular law of effect.

The runner who has been wounded or crippled before starting out upon a race to win a prize, may not fairly be expected (other things being equal) to arrive at the goal in advance of his fellows, or at the same time.

A heart crippled and wounded, its beautiful valves broken and deformed by the form of muscular *degeneracy* and *infiltration* which alcohol superinduces upon it, may not be fairly expected to hold out in the race for life with the structures which have not been crippled in the out-start.

Such a condition of the great central organ of the circulation, with its provinces and dependencies, cannot fail, in many, many instances, to leave the goal in possession of the rider upon the pale horse; or the absence of such a condition as the one just mentioned would have left it in a condition for holding out in the race with the vital organs and tissues in general, until they had all reached a more advanced point in the direction of the prize before death placed the seal of victory upon them.

I know that it is exceedingly difficult, at times, to determine the fact that the heart is actually thus crippled, or to determine the extent to which its resources have been impaired.

A history of the consumption of regular daily quantities of spirituous beverages (*and the amount is not necessarily*

large); the absence of any disease known to affect the walls or valvular mechanism of the heart, with the absence of cardiac signs or symptoms in early life; a tendency to cyanosis, not based upon a sufficient amount of pulmonary infiltration to warrant its presence; first, sound over the mitral area, which sound is indistinct and wanting in its physiologic characteristics; a rapidity in the pulse rate, with diminished volume, said effect being out of proportion to the degree of progress which the disease has made, would warrant us in referring the trouble to a chronic alcoholism of the cardiac walls and nerve ganglia. In all probability, too, the disturbing effect of the alcohol upon the tissue exists in a latent form throughout the body or in the viscera. When it is possible to detect such a condition of the heart muscles as spirituous drinks are capable of producing, any thought of treatment by the application of rarefied air should be most carefully weighed. Indeed, the existence of such a crippled condition of the heart has, in countless instances, defeated the successful application of any and all forms of treatment, climatic or otherwise. The fatality of the lesion has been determined and the race given over at an early period, when the absence of such a grave handicap would either have enabled us to arrest the fatality of the outcome, or afford to the competitor the means of keeping pace with his victorious contestant for a much longer time.

We have all seen how faithful the heart is to the physiologic charge which nature has laid upon it. We have been sometimes struck with wonder that it still continues to beat and to beat, and then to quiver and to quiver before

it relinquishes its last faithful efforts and becomes a thing of silence forever.

Unless some marked and sudden addition to its usual amount of work has been thrown upon it to cause death from asystole, or unless the patient has been more than imprudent in his treatment of his cardiac center, it will exhibit a tenacity of function not surpassed by any other structure.

It is surprising, too, how long it sends out to the tissues an amount of food which keeps up the standard of nutrition to a comparatively healthful standard, when its walls are in an advanced condition of degeneracy, and its beautiful valvular mechanism all distorted, deformed, and broken. We are reminded by the conduct of the heart, under such bad treatment, of the sandal-wood, which imparts its odor to the woodman's axe, which affects the wounds which destroy its life. It is the power of the tempest which detects the disease's mask or the torn and weakened sail. An alcoholic heart may give few signs of its presence when the system is not affected by any other disease, but the presence upon the scene of a malady so serious in its fundamental character as is tuberculosis, may serve to direct the attention to a heart all weakened by deterioration of its muscular and nervous structures.

Since all forms of force which the various structures are fitted for producing depend for the conditions of their production upon the integrity of the circulation, such a serious defect must be far-reaching in its extent and correspondingly fatal in its tendency.

Disastrous Effect of Alcohol upon the Brain.—Before re-

marking upon this subject, let me say that I do not wish to be understood to say that the use of alcohol leads directly to tuberculosis. I do not wish to be so understood. I think, however, that all pathologists will acknowledge that no more harmful effect upon the nutritive function has ever been exerted than the alcoholic effect when found present in some of its intensified forms. Those, too, who do not look upon the power of alcohol as being unfavorable to the development of phthisis, must honestly admit that the habitual consumers of large daily portions of it are the most difficult cases to conduct safely through a severe inflammatory lesion of the pulmonary organs. It is, I believe, now almost universally admitted that there is an alcoholic pneumonia which is just as destructive in its salient features as non-alcoholic pneumonia is in its salient features.

It must, indeed, be difficult to explain how an effect which subtracts one unit of force after another from the sum total of units which preserve the proper relation between waste and repair, should not lay an appropriate foundation for consumption in its most fatal forms.

An agent, too, which is capable of directly influencing the pulmonary circulation to the extent of setting up a low and tenacious form of pneumonia, can scarcely be said to militate against that list of causes which rob the system of its resources by the over-consumption and consequent bankruptcy which they produce.

To our discussion. The reciprocal relations of mind and matter, and matter in the form of the cerebral mass, upon the perhaps less highly developed tissues, are yet in the

embryonic stage of development; yet much that has a practical bearing upon disease is now known.

It is impossible that an agent which produces such radical results upon the gray matter of the brain, and the brain substance in general, may be allowed to exert its effects without producing a morbid reflex of greater or less intensity upon the general tone and activity of the body.

To this, add a morbid psychic effect, with its power to take away appetite and to profoundly affect the system at large, and who may dispute the assertion that the resources with which we meet disease in other forms are crippled to a greater or less extent? The scalpel and microscope reveal the presence of changes, too, which take place so insidiously as almost to escape the notice of the most careful observer. Apparently, latent as they seem to the eye of sense, the morbid reaction of their presence adds one more feature or factor to the forces of the enemy.

My own experience has been that the forms of general nervous debility which spirituous beverages produce, especially when taken in large quantities and for a long time, are features in a grave case which render any hope of ultimate recovery a bare possibility. We must not forget, either, that while alcohol retards the waste of the tissues, such retardation is not a physiologic process, but one which soon disturbs the balance in favor of degeneracy or impaired resistance. A complete discussion of such forms of deterioration may not properly be entered into in a work of this character only as it elucidates the point which we are trying to sustain because of its scientific accuracy.

We are dealing, it must be remembered, with fundamentals and not with details. Upon the substratum laid down, it, I think, may be plainly deduced that the action of alcohol in its most comprehensive range of morbid effect is of such a nature as to militate more or less successfully against any plan of treatment, I care not how well adapted it may be to the case, be the plan medicinal in its features or be it climatic. It is not at all difficult to comprehend, upon the basis herein contained, that the application of rarefied air might be, in many cases, successfully applied had not consumption found the body occupied by a foe to life most congenial to its own tastes and inclinations. Every one knows that a study of individual details is as varied a process as the number of individuals comprising the races and nationalities.

SPECIFIC TUBERCULOSIS.

The bias which syphilis gives to consumption is yet a matter of dispute among recognized authorities, its real nature being vested, more or less completely, in obscurity. I have not seen enough of cases to convince me that syphilis sometimes expresses itself in what may properly be called a tubercular form, or that the *direct* relation which it bears to consumption is the relation of cause and effect. The profound nutritive changes which it produces, the destructive forms of inflammation which attend the entrance into the system of its subtle poison, form a fitting habitat for a disease so closely allied to it in its effect upon the general nutrition. The author's experience has been that a phthisical process which has ingrafted itself upon the disturbed

condition in which a specific virus has left the system, renders said disease unusually active in the nature of its intensity and destructive in its local expressions.

We find, too, that it yields small obedience to mercury and the iodids. Indeed, unless we have a well-founded belief for the position that the poison has not been eliminated previously to the inception of the tubercular expression, their use should not be resorted to. The question that has not been satisfactorily solved is, Does syphilis terminate in tuberculosis, or does it impress upon the system such a condition of vulnerability that the possessor of such a bias not only becomes a ready prey to the disease in question, but to death as well? An affirmative reply to the latter question is probably the true explanation of the bias and the fatal tendency as well. Consumption may not, I believe, more properly be called syphilitic than the effect of certain trades and occupations may determine the *peculiar* name of the disease.

No one will attempt to dispute the fact that the factors instrumental in superinducing a bias have much to do with the ultimate fatality of the disease. Witness the baneful effect of the substratum laid by insufficient food and wretched hygienic conditions in all its phases. How defiantly the superstructure resting on such a basis resists all attempts to raze it! Such we take to be the true nature of any destructive stamp which syphilis, as a forerunner of tuberculosis, places upon its cause and character.

We have all noted a similar illustration in that deeply-laid distortion of the system which the life of a printer produces, and yet we do not speak of the disease ingrafted

thereon as printer's tuberculosis, fatal as it proves to be in its ultimate effect. We note that such a bias swells the mortality rates from this cause to a number equal to the one expressing the aggregate of death rates from all other causes.

The particular, then, as well as the broadest principle which we must recognize as having its expression in such clinical experiences, is that all careful and accurate computations of probabilities must take into account the units of force subtracted by a peculiar bias, as well as take into consideration the immediate exciting agency.

My readers will note, too, the difference between the immediate cause of the bias and remote cause, to which we shall now direct your attention.

I have stated previously, and it can do no harm to repeat it, that a foundation which has been laid by a reckless and prodigal expenditure of capital, which has reduced the finest physical form and the most beautifully developed muscular system to a condition of bankruptcy of force must be estimated in its relation to the possessor's sometime vigor.

There are those, to-day, who will tell you that the foundation of the building, of which consumption is the superstructure, is laid sure and fast in the invidious changes which have taken place in the nervous mechanism.

REMOTE INFLUENCES.

Perhaps one of the most comprehensive terms in our language is the term evolution. The wide gulf which

at one time divided two great schools in their search for truth, has almost entirely disappeared. With reference to the fundamental features of the subject there is little difference of opinion. Just what degree of potentiality existed in the original germ, science may not truthfully state.

We do not know that what may seem to our limited understanding to be perfection in development is perfection.

The stream never rises higher than its source. By the imperfect a perfect type may not be conceived. Nothing but the great primal standard of development, which the perfect only may grasp, would warrant us to discourse of perfect types. The most advanced exhibitions of evolution still contain many marks of imperfection. A thousand influences have been operative in arresting the upward progress of the race. Evidence upon evidence appears to warrant the statement that man, as an object of study to-day, is a creature widely different from the personality stamped upon him as an original capacity for development.

The whole beauty of the physical structure which was contained in the mind of the creative architect, has been sadly marred. Obstacle after obstacle has lifted up its gigantic form in the pathway of that progress which leads onward and upward to higher and yet higher forms. Notwithstanding the fact that perfection was the royal stamp of potentiality or power, to reach a complete expression of evolution, we have to-day all about us what we may rightfully term degenerated stock or forms of arrested development.

We behold contingent products in a most varied degree

of progression and retrogression. The current of real life has been swayed from its course. In some instances the deviations are marked and painful to behold, when compared with our limited, but yet highest conception of the true direction in which it was designed to flow. . . . In some cases, by a false, inherent conception of the channel, morally and physically it has been turned by violent contact with obstacles which have swayed it rapidly and surely from its course.

We all know of striking instances, too, in which life's true current has been reversed,—flowing on its backward course with a greater rapidity than the progress which should have determined its flow in a physiologic direction.

Science, philosophy, and a spirit of the broadest philanthropy have been putting forth their highest and best efforts to keep the stream of development in the channel which will nourish upon its banks the lasting perfume of that self-complacency, which springs as a beautiful flower from the best-directed efforts to raise ourselves mentally, morally, and physically to the highest expression of life.

The three main elements in life's current were unmistakably designed to flow along peacefully, side by side, enhancing and increasing the strength and beauty of the complex whole.

But, alas, in how many, many instances the waters are a violent, turbulent, disturbed mixture of current and counter-current.

The moral and intellectual elements, in their attempts to cross each other's pathway, toss up a spray of effect in-

dicative of the violence of the contact, and the energy even worse than wasted in their attempt to usurp each other's domain.

Surely nothing but degeneracy can grow out of such conflicts.

Again, the moral and physical elements enter into deadly warfare with each other for the part of the water-course in which nature never intended that they should flow, and in which they may not flow without a serious waste of vital energy.

If the stream might only flow right on in its divinely appointed direction, the constituent elements thereof preserving their proper relation to each other and to the whole—no counter-currents, no usurping of each other's rights, no friction caused by one part flowing sluggishly and another part flowing all too rapidly, no ripples and eddies, no fritting of its banks—what harmony, what music of effect would fall upon the ear attuned to catch the soft *melodies* and *harmonies!* What fragrant flowers would spring divinely fair upon its peaceful, fertile banks; how its course would broaden and broaden; how its bed would grow deeper and deeper; how its momentum would grow more irresistible and yet more irresistible; how its inherent beauty would grow more enchanting and more enchanting, until our highest conceptions, which are mingled with the imperfect in varying degrees, would find themselves bounded by the infinite beauty of the whole, as such a life would reach its stage of transition in the dim, shadowy beyond, where all imperfection will be eradicated, for "the mortal must put on immortality, and the corruptible must

be clothed in incorruption, for there is a body terrestrial and there is a body celestial." Since the stream has not flowed right on we must study it in the light of its deviations, currents, and counter-currents, etc., noting carefully the effect of the energy lost by a circuitous route and retarding agencies. It is not within the range of this little work to take up individually and separately all the remote hindrances which have been projected into the life of the patient upon whom we are about to pass judgment.

The whole subject is replete with interest, it has a weird fascination about it which will give to its pursuit a prominent place in the life and work of all those to whom it has been properly introduced.

The form and beauty of a figure is often destroyed by an attempt to deprive it of its imagery. Pass we now to a few non-figurative remarks. We may not fail to inquire, then, into those factors which have ever and will ever stamp themselves upon the parental offspring in proportion to strength of the original effect, and the remoteness of the influence from the individual who has been compelled to share in its results. Remoteness, we know, may either tend to obliterate, to render the operation of degenerating elements more and more feeble by attenuating the poison, or it may, like the mountain avalanche, gain strength rapidly and an almost irresistible momentum which rushes and conveys the whole in the direction of moral, intellectual, and physical annihilation.

The poison of remote effects may, then, be only correctly estimated as to its virulence by carefully considering the agencies which may either, on one hand, rise up to antago-

nize its development or join hands, on the other hand, with it in a process of progressive deterioration.

The electric word pronounced by John Hunter—assisted and progressive development—indicating the way upward from the invisible protoplasma to the higher organisms, gave the poetic key to natural science of which the theories of Geoffroy-Saint-Hilaire, of Oken, of Goethe, Agassiz, and Owen, and Darwin, in Zoölogy and Botany, are the fruits,—a hint, whose power is not yet exhausted, showing unity and perfect order in physics. "The keynote" to the correct estimate of many patients' resources is contained in the following words: Arrested development, retrogression, and progression.

These various processes may express themselves through the nervous system, through the vascular system, or in an apparently general bias of deterioration which seems to control the whole nutritive apparatus.

The words of Whittier in his sad, sweet poem, "Maud Muller," are here especially applicable:—

> "Of all sad words of tongue or pen
> The saddest are, it might have been."

The saddest are, "it might have been" to the ardent scientist and conservator of the sum total of vital force, as, personally expressed, no sadder words may come when illustrating the operation of those withering, blighting, damning forces, which, like a monstrous leper, attack the very heart's core of that process of evolution which was vouchsafed to the race as an original endowment. No more precious birthright could have been given by the Father

of all evolution to a race of human beings, than the possibility and potentiality resident in the expression "progressive development." But, since we have abused it, misused it, trampled it contemptuously under our feet, nay, more, carelessly tried to barter it for the husks of a misdirected life and squandered resources, we must take into account all that has been lost to us, and all that has come to us as an unwelcome legacy by such a misuse of it.

No honest, painstaking adviser may overlook *remote influences*, as he slowly, but accurately gathers for a final decision the too often well-spent resources of his patient.

While it is with a feeling of mingled horror and grief that we contemplate the awful legacies bequeathed by grandparent to parent, and by parent to child, we must contemplate them or we shall be lacking in that scientific precision which should swell with feelings of complacency the heart of every philanthropist.

PELVIC INFLAMMATION.

Those forms of tuberculosis following pelvic inflammation, whose products have become converted into centers from which septic matter is carried to the pulmonary organs, deserve a brief notice. It is not infrequently the case that a pelvic disorder which has become silent, is credited with producing symptoms which are a result of a secondary tubercular deposit. When the signs and symptoms warrant the conclusion that caseous degeneration of pelvic products has taken place, the lungs should be carefully explored, from time to time, to determine if any

of the septic matter has entered the blood or lymphatic system in a sufficient quantity to set up secondary foci of inflammation.

I shall dismiss this subject with the remarks that the general disturbance in the patient's vitality is caused by the pelvic trouble as a local disease. The depression of the constitution which the entrance of septic material is known to produce, by its contact with the tissues and organs in general, lays a foundation for the phthisical expression which is peculiarly favorable to its progress, and which, in most instances, should preclude all thought of treatment by a distant resort. The conditions for the arrest of the disease which has gained foothold under such unfortunate circumstances make it difficult to successfully apply therapeutic measures of any kind. Rapid progress is the destructive characteristic of consumption under such conditions.

That group of cases acquiring the disease through the medium of occupations whose influence is *intrinsically harmful*, or in which the disease may be directly traceable to these causes to the exclusion of other harmful factors and is not far advanced, have much to hope for by exchanging their work for pure air, tonic elevation, relaxation, and healthful influences.

Variety to which the Disease Belongs.—Phthisis florida, catarrhal phthisis with a croupous element, fibroid phthisis. With reference to the first, the usual suddenness of its inception, the rapid advances which it makes, and the corresponding debility exclude all such cases from the benefits of a distant resort or changed resort.

This form of the trouble leaves its imprint upon its victims so early and so unmistakably, that no discussion as to the treatment of this kind is necessary.

The catarrhal form is the one we have been discussing *in extenso.*

The catarrhal form with a croupous element might, not improperly, be called a subacute variety of the most acute catarrhal form, and offers little hope of response to any climatic influence.

Fibroid Phthisis, Fibroid Pneumonia, etc.—This variety of consumption may, and does not infrequently, remain in a condition of chronic activity for a time, and then becomes latent. This is especially true of a fibroid change affecting the base of the lungs, where it may remain for a lifetime in some cases, with no more serious effect upon the general health than a small amount of dyspnea and some lack of muscular tone, the former resulting from the compromising effect which the fibroid induration has upon the respiratory capacity, and the latter from the additional force required in keeping up the supply of energy for the tissues, and in part from the unfavorable reaction of said process upon the general vigor.

The exceeding slowness of the process in all cases of the typical forms of this disease renders the application of climatic influences much less a matter of experiment than it often is otherwise. A process of readjustment is not attended with so much danger of lighting up a rapid and fatal intensity in the unstable tubercular tissues. The disease admits, too, of a longer time for a process of readjustment, whose ultimate effect is either the arrest of the malady

or the addition of months or years to the patient's life. More time is permissible, too, in becoming familiar with the full nature and character of our patient's resources. Unless the medical adviser is conversant with salient points in the most healthful resorts, it will be greatly to his advantage, and to that of his patient, to take sufficient time for so careful and thorough an investigation as will enable him to apply it to his patient's condition with the most effectual results.

These points, too, I feel that the careful, painstaking physician will not overlook, but will, on the other hand, use them in conferring all the advantage that they may contain both for himself and patient.

Concluding our remarks, let me say that all complications in any and every form should be carefully weighed. Yesterday, a young man who had phthisis and who had been under my care only a few days suddenly dropped dead upon the street. I had discovered when examining his lungs that he had, in addition to a serious tubercular involvement, an aortic valvular lesion, to which I attributed part of his dyspnea. I cautioned him to be careful not to exhaust himself in any way. Had I not given to him the warning which I did I would have felt guilty of neglect in failing to inquire carefully into the full extent of the trouble.

Let us see to it that we do not fail to give our patients that careful inquiry into their condition, which will offer to us and to them the only reliable basis for correct treatment.

It seems strange indeed, but almost inevitable, that I should feel it my duty to say: Brother, be sure that your

patient has tuberculosis before you advise him to do what in many instances would materially damage his business, and either separate him from his home and family or compel him to take his family with him at the loss of much that has become dear to all of them. I repeat it, this warning is not without a knowledge that such advice is not infrequently offered, and may be acted upon or may be disregarded as foolhardy by some member of the family whose medical knowledge is confined to the wholesome dictates of common sense. A flourishing business man of this city surprised me not long ago by telling me that he was advised to close out his business, which could not have been done at that time without a heavy loss in his bank-account, to say nothing about the worry and expense of conveying his household to the far West and moving to a distant western town. Fifty thousand dollars would not have covered the *financial* loss to the family had such advice been acted upon. Consider, too, the sundered ties, the longing for the old home, and numerous other deprivations which it is not necessary to mention.

I am sure that my readers are interested in knowing upon what basis counsel involving such an immense loss in every way rested. Hear. Some debility, the result of a severe cold, a cough which had existed for years, and had, of course, become worse when an acute bronchitis was ingrafted upon the chronic condition of which I shall now speak.

Dyspnea, which, I confess, was rather marked, and in addition to this, we noted some loss of appetite and dyspeptic symptoms.

Said gentleman became a patient of mine a year, or perhaps two years after this warning note had been sounded by his sometime family doctor. I will remark (to be altogether fair) that the respiratory difficulty in the case had been present for a number of years and his general muscular tone somewhat below par. A careful exploration of his pulmonary organs revealed the satisfactory result of lungs most thoroughly developed, and with the exception of a few moist rales at the base in almost perfect condition. Indigestion was a somewhat troublesome accompaniment of the root of the evil for which an attempt to explore the liver was made. I found his heart or the left ventricle hypertrophied to a considerable extent. The action of his heart was marked by a morbid irritability, which was largely a gastro-intestinal reflex, and my stethoscope conveyed to me the evidence which pointed to a diseased aortic valve. Regurgitation into the left ventricle was taking place and the compensation had either never been established or was ruptured at the time I saw him to the extent of producing the greater portion of the dyspnea, all, indeed, but the part which was the result of gaseous distention of his stomach and intestines. Digitalis, iron, quinin, and strychnin, with a mixture of pepsin and hydrochloric acid to be taken with his meals, removed the cough, dyspnea, muscular debility, etc. The necessity for sending him away has never returned. Slight dyspnea, when he has over-exerted himself, is quickly removed by a few doses of digitalis, caffein, and strychnin. This matter of advising patients to be sent away upon the basis of a mis-

taken diagnosis has come under my notice so frequently recently that I have been led to speak of it here.

We shall conclude this little volume by a brief résumé of the cardinal or salient points which we have presented, hoping, too, that it may prove as interesting as the subject is practical and important.

What with our cycles, well-equipped gymnasiums, and modern conservators of health, that lack of power to counteract modes of living which are better counteracted in more lofty elevations has been, or may be, largely taken away.

The decade binding together the years twenty and thirty (the so-called vulnerable decade) is not scientifically a vulnerable one, except on the basis upon which any time of life is a vulnerable time.

The vulnerability of twenty and thirty, and the intervening years, may well be translated to be years in which the expenditure of the golden months and years has been stamped with a reckless prodigality and lack of prudence, which are usually not so typically manifested either in the second decade or in the fourth or fifth. Prodigality leading to a lost balance in the nutritive energies in favor of the destructive powers is the word for vulnerability. Bankruptcy is the vulnerability of any age.

While the incipient stage of consumption is more favorable to, or yields the best results to our therapeutic resources, the third stage does not render climatic treatment in all cases inapplicable.

I repeat my caution,—be not misguided by the fact that

you have present the physical evidence of an excavation. The cavity may be becoming quiescent. Watch it carefully for a time before making up your mind as to its seriousness, or before you conclude to use it as a check to a radical plan of treatment. I remember, when I was physician to the out-patient department of the Rush Hospital for Consumptives, of this city, that I was visited one day by a young lady twenty-two years of age. A glance at her was almost sufficient to indicate to my mind that, if she was a consumptive, she was not then suffering from an active process of infiltration or degeneration. She was somewhat anemic, but otherwise had not the general appearance of one who was afflicted with an incurable malady. Her family history was exceptionally good; her father, mother, and other members of the family were strong and well. I failed to elicit a history of any illness that she considered at all serious. She told me, too, that she had been recently insured in the "Metropolitan Life," of New York, the physician, over whose name I shall throw the cloak of charity, having given her application to the Company as "a first-class risk." I began to percuss her chest above the right clavicle, which area raised, quite promptly, a mixed tympanitic note.

The first percussion stroke which I made below the cavity elicited a typical cracked-pot note. Below the cracked-pot area, the mixed flatness terminated in a dullness, which gradually faded off into the normal note about the fourth interspace. The chest-walls being thin, and the cavity being located near a large branch of the right bronchus, the sound which any tyro could have produced,

had all the features of a clear, ringing, cracked-metal intonation.

How such glaringly tangible signs could have been overlooked, it is difficult to understand, but overlooked they were, notwithstanding the fact that there was present, in addition to the percussion phenomena, a distinct, low-pitched, cavernous inspiratory and expiratory sound.

The moral is, that while I do not wish my readers to give to a cavity too much importance simply because it is a cavity, I hope that none of them will overlook it to the extent of offering the patient to a life-insurance company as "a first-class risk." "First class-risk" is, I believe, the technical term, amusing as it is to one whose sense of the ludicrous has been highly developed, but I must crave my readers' pardon and hasten on, yet I do not see why a medical article should be so awfully medical as to rob it of the "spice of variety," do you? I sometimes feel that I should have been knighted long ago for my gallant defense of the "King's English," but I can wear my plumes and golden spurs in imagination, and I would have to doff both in the bower where the best English is usually spoken. I have noticed, too, that our American king does not seem to have any special fondness for his English; perhaps that is why my golden spurs never gleam at the side of my noble steed, or horses, I believe, we ride nowadays. This by way of parenthesis and restful variety. As long, too, as writers in the field of general literature will medicate their productions, as some one said of Dr. Holmes's spicy novels and writings, why should not writers in the field of medical literature occasionally throw in "gratis" something that

does not hit the nail squarely on the head at every blow of their hammers? I had intended to speak of just how scientific a phrase "first-class risk" is when intended to mean something widely different. The young lady in question was a first-class risk, as she lived long enough under the conditions of the policy, and one day longer, to receive its face value. I can scarcely believe that the doctor really knew what a good thing it was for the family to have received the face value of the contract, and how first class such risks are for the "Metropolitan Life" or any other company. As foreign to my subject as all this may seem, it is not, but bears with it a most serious revelation. I assure that this instance is not the first one which has come under my notice. Perhaps I should have discussed this matter of "first-class risks" sooner. Such facts, and knowledge of how insurance companies are defrauded, and such glaring errors made by men of otherwise mediocre intelligence, is one of my prefatory reasons for not offering any apology for the preparation of a work which, if rightfully used, will, I believe, do much to protect risk companies. While I have no more interest in insurance companies than I have in any other honest company, the strong love of justice, which was planted deeply in my young heart by a devoted father, would lead me to desire justice for them as I would crave it for myself. Such valuable risks for life protective companies ought to yield to the therapeutics of a higher level than our own the most happy results. To all to whom such mistakes cannot be truthfully or justly attributed, these remarks will not be objectionable, and to all to whom they are truthfully appli-

cable, I would say that, while I am always ready to throw over human errors the veil of the kindest charity, that viewed in the light of what physical diagnosis has and is still bringing to us in a larger and fuller measure, such blunders deserve the severest censure. We all know only too well what painful limits there are to human skill, and how we would often gladly give all that we possess if we might stay the hand of death from seizing his victim. We deeply deplore the fact that there is yet much in our conflict with disease that is more or less empirical, but this makes it all the more imperative that we should have the use in our investigations of all those methods of detecting disease which modern science has placed within our reach.

Crowding should be looked upon as unfavorable to the best method of treatment, the intrinsic influence of massing together large numbers being injurious. The usual manner of life in connection with it is lacking in that feature of resistance, which is of vital importance in the management of phthisis.

In the language of Dr. G. Stanley Hall ("Report of the Ninth Annual Meeting of A. A. A. C."): "Our cities are getting to be biologic furnaces that burn us out to the very socket."

The effect of crowding is absent in the country, and if country environment will conduce to more uncomplicated methods of living the furnace power will be greatly lessened.

The psychic effect of the emotions should be carefully studied. Retrospective, immediate, and prospective, their power is almost unlimited, and they may be used with

wonderful potency in any plan of treatment. A remorseful retrospective view, a depressing contemplation of present conditions, and a hopeless outlook, one or all, if not removable by the skilful psychologist or psychophysiologist, give to the prospect of cure a most unsatisfactory promise of better things.

Vital Capacity.—The height of the elevation, other things being equal, should bear a constant relation to the amount of vesicular structure present in a given case, as the end or therapeutic effect of the most salubrious climate may be annulled or defeated by the presence of a small amount of this vital index.

Neurotic Element.—A neurotic expression of a large amount of disturbance in the nervous system, especially a manifestation which is greatly disproportionate to the extent of the pulmonary involvement, will render the sending of such a patient away a matter of great risk, as the balance will in all probability be restored in the form of a rapid and extensive local involvement, either along the gastro-intestinal canal or at some point in the tissues, central or otherwise.

Temperament.—This feature of the case should not escape our analysis, nor should we fail to give to it its true place either as a friend or an enemy to our therapeutic and climatic resources. The man or woman with a well-balanced, nicely educated temperament has much the advantage over one who is not so constituted. The daily amount of strength expended by the endurance of a countless number of mosquito bites may make a large aggregate.

People out of tune with the world are bitten while others escape.

Temper.—"A man that ruleth well his own spirit is better than he who taketh a city." A sweet, sunny disposition, a lack of that flash-in-the-pan temper, which we so often see and which indicates the absence of training of the part of the organ of the mind through which checks or a well-developed will are operative, has much advantage to give to its possessor. It is the tempest which detects the diseased mass, although outside it may be fair to behold. Little ebullitions of temper oft-repeated will *waste* the energies, and should not be disregarded in our careful summing up of evidence.

Sedentary Occupations.—Such methods of gaining a livelihood as are embraced under this heading must even in the most healthful climate be abandoned. The necessity for pursuing the mode of life largely operative in the production of the disease will in all probability defeat the "best laid plans of men."

Self Comparison, Disparity and Disproportion of Two Individuals, Both Seeming to be Equally Strong or Equally Weak.—The one whose present condition is an expression of the greatest disparity or disproportion between his present state and his old-time vigor offers the smallest hope of advantage. Involution bears a relative connection to evolution. When the evolution processes have reached a high degree of development, the sequel of the retrograde metamorphosis is reached before the general debility has become so far advanced. This is a guiding principle.

Recurrent Hemorrhage.—This phenomenon when not associated with or an outgrowth of an active tubercular process should not militate against the idea of risking a much more elevated region.

Philosophic Contemplation.—This phrase is used with a variety of meanings. The thought which we wish to embody in it is the following: it differs first both from temperament and temper, referring more properly speaking, to a native principle, which *principle* gives to an idea many and varied responses.

Temperament is largely conditioned by the philosophic nature, which may be fitly compared to a ballast which keeps the ship steady in a time of storm. Those fortunate individuals who regard their environment and the situation in life in which they find themselves, be it desirable or otherwise, with a calm, dispassionate gaze, and with that philosophic coolness which has done more to make men and women great than perhaps all other mental features, which gives them a fitness, too, for great emergencies, and which manifests itself by a placidity of soul when others show that tempestuousness which rapidly consumes the fuel of the mind, have much the advantage. A calm, dispassionate view of life is one of your great conservators. Fortunate is that one who may possess the power to so look upon it.

Muscle Training.—The next decade will have gained much by the advances which have been made in the one that is closing.

It is for me a hopeful feature, and a matter of rejoicing that the best minds and the most profound scholars are

becoming more and more interested in the important work of a natural system of training the human form divine for more work and a greater degree of resistance to many forces whose influence and direct tendencies are now evil, which will be shorn of their power, and this will be true to a greater and yet greater degree.

As physical education becomes more and more advanced, as it reaches a higher and higher plane of perfection, as its range of applicability becomes more comprehensive and is applied with more scientific precision, degeneracy itself and degenerating tendencies will be largely held in check. The rose-bloom of health will light up and brighten cheeks, which under the old régime would have possessed nothing to impart one picturesque feature to the universal pallor.

Anemia.—When existing as the evidence of a profound systemic involvement, it is ever to be regarded as a most serious feature,—most serious in that the preparations of iron and strychnin have little or no power to check its onward course. It renders no obedience to our most powerful hemogenic stimuli. Make the distinction between anemia as a result and anemia as tending to produce phthisis. Simple anemia does not tend toward tuberculosis directly, only as it forms a link in that chain of influences, which terminates in that bankruptcy upon which phthisis is directly ingrafted.

Age.—Do not disturb the tender plants which are too young to respond to influences, which act largely through the nervous system, unless it may be in the sultry months, in the seething, filthy streets of the poisoned and poisonous air of our great towns and cities.

In all such cases, the pure balmy air of some upland place is to them the blood of health whose transforming power soon transfigures them into things of life and vigor.

Microscopic Forms of Semi-plant Life.—Such factors, whatever may be their relation to the disease or whatever part they perform may well be ignored in mapping out for the patient a plan of treatment, climatic as well as individual.

Location.—I have shown previously upon the testimony of the best authorities and upon the strictest scientific basis, that a basic involvement is, because it interferes in not a few instances with the typical tendency of a tubercular process, more favorable to the reparative processes than is an apex involvement. A basic involvement, affecting a large portion of the lung, will clear up or become latent when an apical involvement of the same extent will either not clear up or go on to the stage of cavitation before its arrest is accomplished.

Alcoholics.—Alcohol and tuberculosis are both too epicurean in their tendencies to be looked upon as being enemies to each other. They both seem to have a preference for the daintiest morsels, in the form of the most highly specialized centers, the gray matter, intellectual organs, thought areas, moral areas, judgment areas, areas as organs of the esthetic feelings, areas of the higher and most refined emotions. Alcohol, too, seems to have a special fondness for the most highly developed types of muscle fibers as found in the heart and those groups which may be trained to coordinate movements with the most beautiful nicety. Does it not seem proper that such similarity of

taste should entitle such epicures to be called, scientifically speaking, boon companions?

As a result, so to speak, of developing this treatise by the natural method, I have up to the present entirely overlooked a point which I deem of much importance. In writing of fibroid phthisis you will remember that I directed your attention to the advantage to be gained by the usually extreme slowness of the process, giving to us more time for a careful weighing and estimating of our patients' resources, the immediate tendency of the morbid process, and such a familiarity with the climate or climates under consideration that there ought to be much less liability to making a mistake and advising a plan of climatic treatment that would be injurious.

The point to which I especially crave your attention is the suggestion that safety may be guaranteed only, in not a few instances, by waiting, after a full inventory has been taken and a thoroughly sound plan of treatment has been adopted, including, of course, the fullest attention to details, by waiting, I say, for the effect of the new influences to which our confiding wards have been subjected. Where it is at all possible, we might better use not only his present resources as a guide but add to the foundation of our opinion the important index which response to therapeutic measures will furnish us. The two effects or three effects, which all remedies and hygienic influences must necessarily have, may be summed up in the following language: Patient may gain and yield a favorable response; the response given is not what we should expect from the remedies used and our estimate of his vitality; or the

response seems to be negative, or more properly speaking, the disease is, so far as we may determine, at a standstill. We should not, however, be deceived by the nature of such a response or such a negation of results. Under a proper plan of treatment there is no such thing as negation of results. I have seen much to impress me with the importance of a wise course of management, even when the case has the seal of death firmly engraved upon it. I have seen medical remedies withdrawn on the ground that the case was hopeless and treatment useless. From so unwise a conclusion I have noticed a sudden and rapid extension of the malady. I have seen cases which I know, from a large amount of analogous experience, would have lived six months under the treatment die in six weeks or in a shorter time. The ability to hold the disease in check is often a wonderful exhibition of skill and may lead to a final victory for the means employed. The ability to improve the patient's condition, materially it may be, is often a much less exhibition of skill on one hand than the ability to hold the disease in check upon the other or to slow the march of the malady. The proper application of all treatment is relative and positive. It is impossible for it to be negative ; negative it cannot be, it must be of necessity either injurious or beneficial. My point is first, that the demonstration in a given case that our measures have held the malady may be such a triumph on our part that it should or might warrant a recourse to more radical measures. The point may perhaps be intelligently expressed by stating that after the facts in the case will permit us to retain the patient under our care for awhile, the *relative*

effect of our measures may enable us to determine upon which side of the balance to place him—the at-home side or the not-at-home side.

Another form may perhaps make my meaning more thoroughly comprehended. (Teachers always labor to be clear or at least they should.) A scale of comparative effect may be the following, or is often the following: Arrest of the progress of the disease or the bringing it to a standstill, so to speak, may indicate a better response to our remedies in one case than the ability to produce an improvement, which, though decided, may not be at all permanent, and would not warrant a recourse to a distant land, while the former might crown such a step with life. Again, the ability, as previously stated, to slow the rapid progress, which the disease *had been* making, may indicate a more pronounced response than the power to bring it to a standstill in another case. Such a response, too, may warrant the sending of a patient away with the result of greatly improving his condition for the time being and, if it is not too much to hope, of a recovery, if the pulmonary destruction has not advanced *too far*. This topic should have been discussed under responses to treatment. I am not sorry that I overlooked it, as its importance entitles it to a separate and individual space, and its discussion under the fitting title of *relative responses* will, I hope, give to it a boldness of relief in the group of subjects which it justly deserves. Whether you deem it best to send the unfortunates away or to retain them at home, I bid you not to, as I have seen so often done, withdraw a *well-directed* plan of treatment in the belief that the case is hopeless and you

have not succeeded in entirely arresting its progress. Your treatment is not negative, and I care not how rapid the progress the disease may be making, you have only to place side by side two cases as much alike as possible, use active measures in the one instance, use nothing in the way of a check in the other, and you will, I know, be surprised, if you have not already seen it demonstrated, by the amount of good your medicines are doing. I hope, though, that all to whom these words may come will have sufficient faith in the truthfulness of my statement not to make the experiment. Enough of such demonstrations have been made to make such a course on the part of anyone highly reprehensible. Since I assure you again that my assertions have been based upon frequent observations, let me say, too, lest some one might think that I would deem myself excusable in tampering in such a manner with the precious moments of a human life, that I have never done so. I have not infrequently seen cases, who had been under an active plan of treatment in an out-door department, admitted to a home or hospital where the use of drugs in the instances of incurable and *rapidly advancing* cases was not considered advisable. The rapid manner, too, in which I have seen the process light up, and the death sequel of a process, which under former treatment would have been delayed for months, take place in as many weeks. You reply that I am comparing a case with itself, and it might have been a coincidence. Not so, as I have seen such results take place with such uniformity as to dispel all honest doubt as to the relation between the withdrawal of the treatment and the rapid progress of which I

have been speaking; neither is this all the foundation upon which I base my assertions. I have seen some patients treated somewhat on the expectant plan (expecting them to die soon). The results were carefully noted by me. Other cases in the same institution, whose conditions were very similar, I have seen treated by an active, scientific, a rational plan of treatment. I can assure you that the gulf which separated the results obtained by the comparative methods of treatment was sufficiently wide and yawning to be seen by the one most blinded by prejudice, and I was going to say *at midnight.* When the occasion for seeing it has not been afforded, this plain statement resting upon such a basis will render a resort to experiment a moral obliquity which should, and no doubt will, receive its full meed of punishment, since, too, hundreds of men will gladly and earnestly declare their sentiments or testify, more correctly speaking, to their truthfulness. While it is indeed a sad duty to keep the candle burning as long as possible, it is nevertheless a duty. Let us then not hesitate or dispute the ground of the enemy with a lessened zeal because death has placed his seal upon the victim. Rather let such a knowledge and conviction lead to more watchfulness, a greater attention to details, to more devotion to the interests of one who is so soon to depart to—we know not where. As the flame burns lower and lower, as the heart-throbs grow weaker and weaker, as the sight becomes dimmer and dimmer, and the consciousness that the hour for departure is approaching closer and closer, may it often be our sad privilege to utter words fraught with the deepest expression of tenderness and

solicitude, that the beaming sense of gratitude and thankfulness may be shed upon us, and that we shall feel that medicine is not without its reward.

With the remarks we are now making this little volume will be brought to a close. It is with a feeling of regret that we make our farewell statements, and yet the author feels that there is no reason why he should look back upon the work herein done with a feeling of regret. We all, it is true, deeply regret our limitations, and that we so often find ourselves so hemmed in by insuperable difficulties and insurmountable obstacles.

How often, how painfully often, our hearts seem for a long time to be like the heart of Antony—in the grave of some patient in whom we had taken the deepest interest. We hope, however, that the long, careful, painstaking study we have made of this sadly interesting branch of medicine—which is learning to battle more successfully with that enemy of all that has ever gladdened the heart by its superlative charms of exalted life into its highest types of womanhood and manhood—may not be in vain. We fondly hope that the principles laid down, upon a close and careful analysis, may meet with friendly greeting, and may be used in not a few instances in obtaining better results, in the assuaging of grief, in the restoration of hope, in the detention of loved ones among those whom they love and by whom they are loved, and by the deep and lasting gratitude of those who, seeing our heart-felt interest in those whom they love, have thought it well to throw in our pathway that sweetest of all perfumes, even the perfume of an appreciative heart.

INDEX.